SOIL SURVEY OF

Eastland County, Texas

United States Department of Agriculture
Soil Conservation Service
In cooperation with
Texas Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all who need the information, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1965–71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1971. This survey was made cooperatively by the Soil Conservation Service and the Texas Agricultural Experiment Station. It is part of the technical assistance furnished to the Upper Leon and Palo Pinto Soil and Water Conservation Districts.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings, and other structures; and in determining the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Eastland County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside, and a pointer shows where the symbol belongs.

Finding and Using Information

ample, soils that have a slight limitation for a given use can be colored green, those that have a moderate limitation can be colored yellow, and those that have a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and the range sites.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Ranchers and others can find, under "Range," groupings of the soils according to their suitability for range, and also the names of many of the plants that grow on each range site.

Community planners and others can read about soil properties that affect the choice of sites for dwellings and industrial buildings and for recreation areas in the sections "Engineering Uses of the Soils" and "Use of the Soils for Recreational Development."

Engineers and builders can find, under

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SOIL SURVEY OF EASTLAND COUNTY, TEXAS

BY JOE D. MOORE, WINFRED C. COBURN, AND EDWARD R. HARRIS, SOIL CONSERVATION SERVICE

All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Pedernales fine sandy loam, 1 to 3 percent slopes, is one of several phases within the Pedernales series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries [illegible]. The soil map at the back of this publication

high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

mottled, yellowish-red, medium acid sandy clay about 8 inches thick. Below this is mottled, light-gray sandy clay 28 inches thick. The underlying material to a depth of 60 inches is massive sandy clay loam interbedded with weakly cemented sandstone.

Minor in this association are Bunyan, Demona, Elandco, Hassee, Nimrod, Patilo, and Pedernales soils. Bunyan and Elandco soils are on the flood plains of the streams that drain this association. Demona, Nimrod, and Patilo soils

Surfaces are slightly undulating, and slopes are mixed concave and convex. This association makes up about 3 percent of the county. It is about 71 percent Patilo soils and 29 percent minor soils.

Patilo soils have a surface layer of brown, neutral fine sand about 6 inches thick and a subsurface layer of very pale brown, slightly acid fine sand about 40 inches thick. Below this is about 10 inches of brownish-yellow, strongly acid sandy clay loam that has red and light brownish-gray

Bunyan, Deleon, and Elandco soils are on flood plains of streams that drain this association. Chaney, Cisco, Demona, Nimrod, and Patilo soils are in sandy fringe areas. Truce soils are on ridgetops and foot slopes.

This association is used mostly as range or wildlife habitat, for which it is well suited. Some of the steeper stony areas are not easily accessible to cattle. Few areas are suitable for cultivation. The native vegetation is a [illegible] and an understory of tall, mid, and short

plains of streams that drain this association. Hensley soils are on gently sloping ridgetops, and Owens soils are on hillsides and small knolls.

This association is used mostly as range. A few areas of Bolar soils are cultivated. Deer are abundant in most areas, and many ranchers add to their income by selling hunting leases. Wild turkey frequently inhabit areas along streams.

very dark grayish brown and neutral in the upper 17 inches and dark grayish-brown and calcareous in the lower 26 inches. The underlying material to a depth of 70 inches

An important part of each series description is the soil profile; that is, the sequence of layers from the surface

Bolar Series

The Bolar series consists of moderately deep, gently sloping, loamy soils on uplands. These soils formed in interbedded limestone and marl.

In a representative profile the surface layer is dark grayish-brown, calcareous clay loam about 12 inches thick. The next layer is about 26 inches of light yellowish-brown, calcareous clay loam that has many fine concretions and masses of calcium carbonate and a few limestone fragments. The underlying material is fractured hard limestone bedrock interbedded with clayey marl.

Bolar soils are well drained. Permeability is moderate, and available water capacity is medium.

These soils are used mostly as range. A few areas are in crops.

Representative profile of Bolar clay loam, 1 to 3 percent

Bonti Series

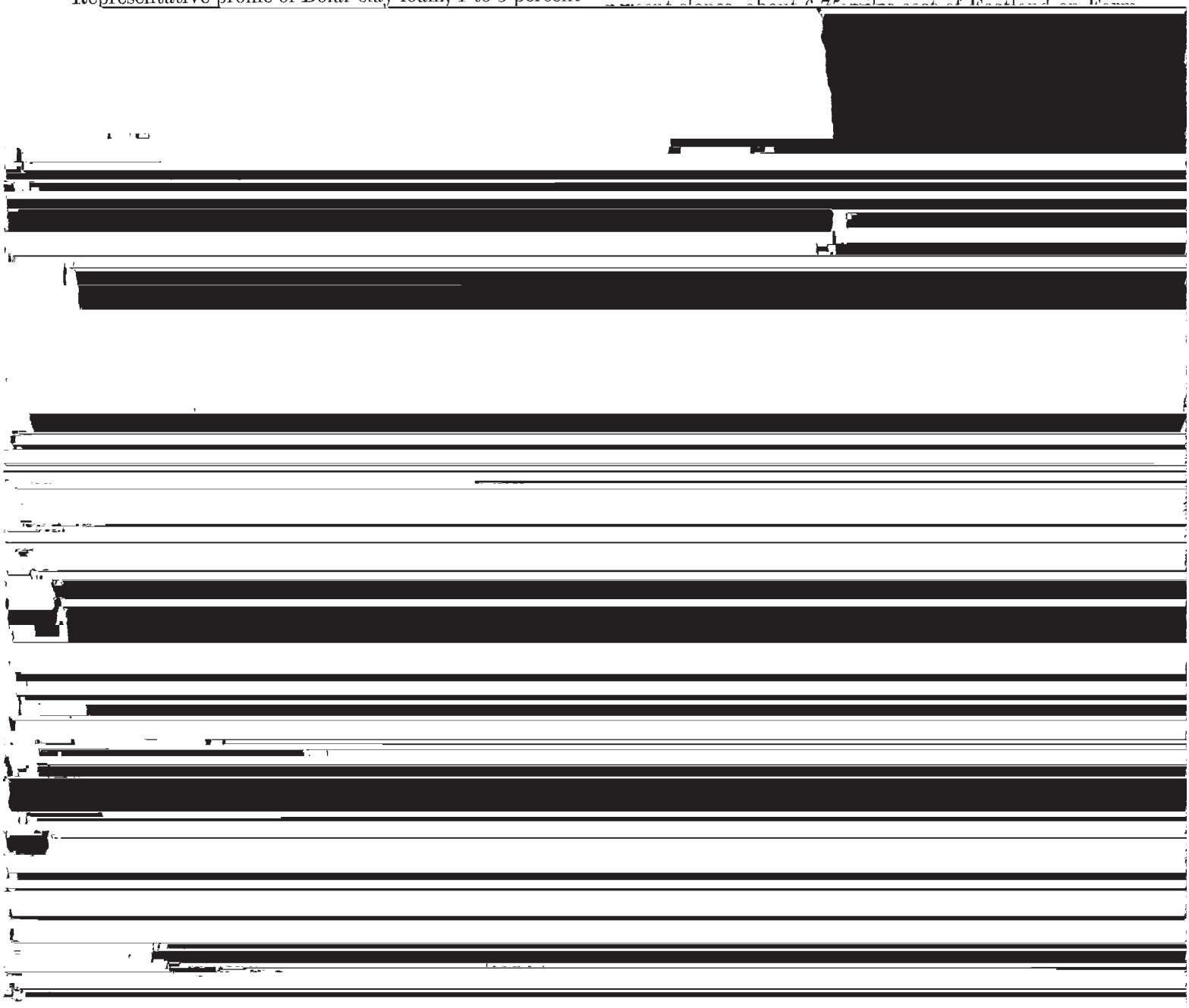
The Bonti series consists of moderately deep, gently sloping, loamy soils on uplands. These soils formed over cemented sandstone.

In a representative profile the surface layer is brown fine sandy loam about 4 inches thick. The subsurface layer is grayish-brown fine sandy loam about 2 inches thick. The next layer is yellowish-red sandy clay about 20 inches thick. The underlying material is brownish-yellow strongly cemented sandstone.

Bonti soils are well drained. Permeability is moderately slow, and available water capacity is medium.

These soils are used mostly as range. A few areas are in improved pasture.

Representative profile of Bonti fine sandy loam, 1 to 3



Brackett Series

The Brackett series consists of shallow, gently sloping to moderately steep and hilly, stony soils. These soils formed over soft limestone interbedded with hard limestone and chalky marl.

In a representative profile the surface layer is about 6 inches of light brownish-gray, calcareous loam that is about 5 percent, by volume, limestone fragments about 1 inch in diameter. From 1 to 15 percent of the surface is covered by limestone fragments 3 to 24 inches in diameter. The next layer is about 10 inches of light-gray, calcareous loam that is about 8 percent, by volume, limestone fragments about 2 inches in diameter. The underlying material is limy loam interbedded with soft limestone, sandstone, and chalky marl to a depth of 40 inches.

Brackett soils are well drained. Permeability is moderately slow, and available water capacity is very low.

These soils are used as range or wildlife habitat.

Representative profile of Brackett loam in an area of Brackett stony loam, 1 to 8 percent slopes, 4 miles north of Desdemona on Texas Highway 16, then 2 miles east-northeast on a county road and 250 feet north of the road, in range:

A1—0 to 6 inches, light brownish-gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate, fine, granular and subangular blocky structure; hard, friable; many medium grass roots and worm casts; about 5 percent limestone fragments ⅛ to 1 inch in diameter; about 50 percent calcium carbonate equivalent; calcareous; moderately alkaline; clear, smooth boundary.

B2—6 to 16 inches, light-gray (2.5Y 7/2) loam, light brownish

[redacted]

than 30 percent of any mapped area. Any one included soil makes up less than 15 percent of a mapped area.

This soil is used only as range. Runoff is rapid, and the hazard of erosion is moderate. Capability unit VIs–1; Adobe range site.

Brackett complex, 8 to 20 percent slopes (BtE).—This mapping unit is made up of strongly sloping to moderately steep, stony soils on uplands. It is about 70 percent Brackett soils and 30 percent soils that are similar to Brackett soils, but 75 percent or more of the original surface layer has been removed by erosion. Areas are oval to irregular in shape and are 10 to 100 acres in size. The soils have 5 to 15 percent limestone fragments on the surface that are 3 to 30 inches in diameter. They cannot be shown separately at the scale mapped, because they are too intricately intermingled or the areas are too small.

Brackett soils have a surface layer of grayish-brown calcareous loam about 2 inches thick. It is about 10 percent limestone fragements that are 3 to 30 inches in diameter. The next layer is about 10 inches of light-gray, calcareous clay loam that has many small concretions and masses of calcium carbonate. The underlying material is soft, stratified, calcareous loam intermingled with weakly cemented limestone.

Included with these soils in mapping are spots of Lamar, Menard, and Tarrant soils. Lamar soils are in areas on foot slopes and along drainageways. Menard soils are in areas similar to those of Lamar soils. Tarrant soils are mostly in areas around the rim of upper slopes. Each included area is less than 20 acres in size and makes up less than 20 percent of any mapped area.

The soils in this mapping unit are used only as range.

have evident bedding planes; neutral; clear, smooth boundary.

C3—40 to 46 inches, brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; massive; hard, firm; thin strata of very dark grayish-brown fine sandy loam and light clay loam that have evident bedding planes; calcareous; moderately alkaline; clear, smooth boundary.

C4—46 to 60 inches, brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; massive; few soft concretions of calcium carbonate; thin strata of clay loam that have evident bedding planes; calcareous; mod-

Chaney Series

The Chaney series consists of deep, gently sloping to sloping, sandy soils on uplands. These soils formed in loamy to clayey materials and interbedded sandstone and shale.

In a representative profile the surface layer is pale-brown loamy sand about 12 inches thick. The next layer is sandy clay about 36 inches thick. It is yellowish red in the upper part and light gray in the lower part (fig. 2).

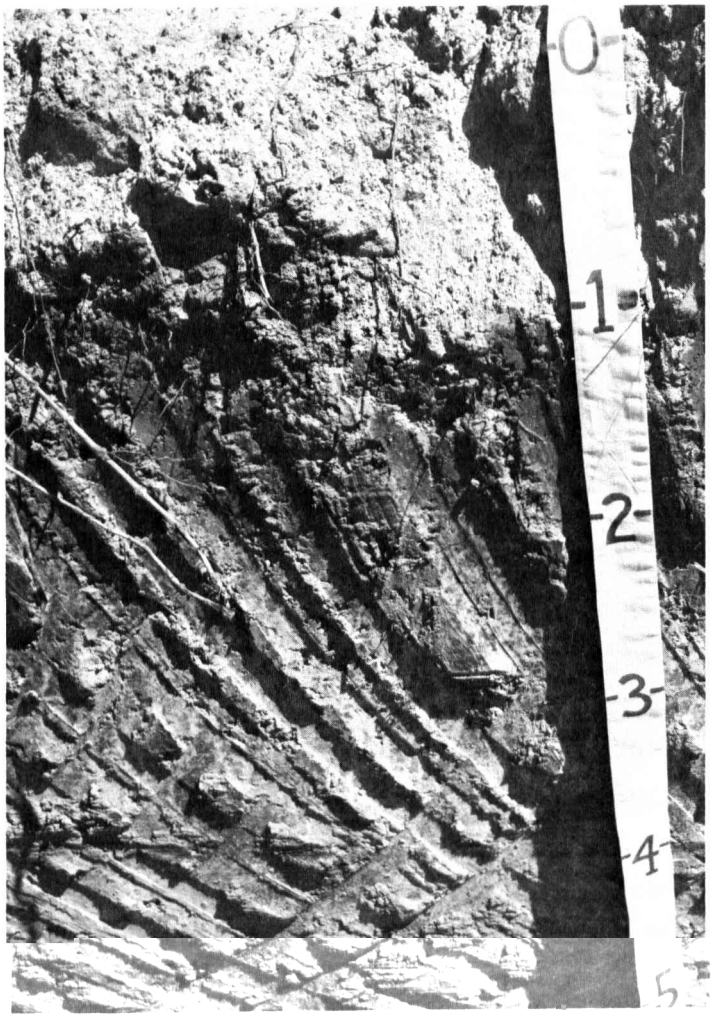


Figure 3.—**Soil blowing in an unprotected area of Chaney loamy sand.**

eastern edge of Carbon, 126 feet north of the highway, in a pasture:

A1—0 to 12 inches, pale-brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; massive; slightly hard, friable; few small pebbles; slightly acid; abrupt, wavy boundary.

B21t—12 to 20 inches, yellowish-red (5YR 5/6) sandy clay, yellowish red (5YR 4/6) moist; common, medium, distinct mottles of yellowish brown, brownish gray, and red; weak, medium, blocky structure; very hard, very firm; distinct clay films on faces of peds; medium acid; gradual, smooth boundary.

B22t—20 to 30 inches, light gray (10YR 7/2) [illegible]

percent slopes, eroded, in cultivated fields. Also included are spots of Demona, Hassee, and Pedernales soils. Demona soils occur in no definite pattern. Hassee soils are in oval-shaped depressional areas, and Pedernales soils are mostly on low knolls or ridges. A few gravelly areas are included. Also included are areas of a soil that is similar to this Chaney soil but has no gray mottles within 30 inches of the surface. Included areas are less than 10 acres in size and make up less than 20 percent of any mapped area. Any one soil makes up less than 15 percent.

This soil is used mostly for cultivated crops and as

percent of any mapped area. Any one soil makes up less than 10 percent.

This soil is used mostly for crops or improved pasture. Runoff is medium. The hazard of soil blowing is severe, and the hazard of erosion is moderate. Capability unit IIIe–5; Sandy range site.

Chaney stony loamy sand, 1 to 8 percent slopes (CmD) —This gently sloping to sloping soil is on knolls and ridges. Areas are irregular to oval in shape and are 5 to 200 acres in size, but they are dominantly about 50 acres. Slopes are convex. About 5 to 20 percent of the surface is covered by loose, conglomerate sandstones that are 1 foot to 6 feet in diameter. The stones in the

Cisco Series

The Cisco series consists of deep, gently sloping, loamy and sandy soils on uplands. These soils formed in calcareous, loamy sediment.

In a representative profile the surface layer is brown loamy fine sand about 10 inches thick. The next layer is yellowish-red, slightly acid sandy clay loam about 20 inches thick. Below this is reddish-yellow, faintly mottled, neutral sandy clay loam about 20 inches thick. The underlying material is light brownish-gray, calcareous fine sandy loam to a depth of 70 inches.

Cisco soils are well drained. Permeability is moderate,

This soil is used mostly for crops. A few areas are used as improved pasture or range. Runoff is slow. The hazard of soil blowing is severe, and the hazard of erosion is slight. Capability unit IIIe–5; Sandy range site.

Cisco fine sandy loam, 1 to 3 percent slopes (CsB).—This gently sloping soil is in broad, shallow valleys. Areas are irregular in shape and are 10 to 100 acres in size. The soil is dissected by weakly defined drainageways in some areas. Slopes are plane to weakly concave.

The surface layer is brown, neutral fine sandy loam about 12 inches thick. The next layer is about 39 inches of neutral sandy clay loam that is yellowish red in the upper part and reddish brown in the lower part. The underlying material is very pale brown, calcareous sandy clay loam to a depth of 60 inches.

Included with this soil in mapping are spots of Menard and Pedernales soils, mostly on small knolls. Also included on lower slopes is a soil that is similar to this Cisco soil but is sandy clay loam to a depth of more than 60 inches. Included soils make up less than 20 percent of any mapped area.

This soil is used mostly for crops. Runoff is slow, and the hazard of erosion is moderate. Capability unit IIe–3; Sandy Loam range site.

Cisco fine sandy loam, 3 to 5 percent slopes (CsC).—This gently sloping soil is on foot slopes. Areas are irregular

Deleon Series

The Deleon series consists of deep, nearly level, clayey soils on bottom lands. These soils formed in calcareous clayey sediment.

In a representative profile the surface layer is clay about 44 inches thick. It is dark grayish brown and neutral in the upper 30 inches and dark brown in the lower 14 inches. The underlying material is dark-brown, calcareous silty clay loam to a depth of 64 inches.

Deleon soils are moderately well drained. Permeability is slow, and available water capacity is high. These soils are flooded at intervals that range from one or more times a year to once every 3 years. A water table is within 10 feet of the surface during most years.

These soils are used mostly as native range or improved pasture.

Representative profile of Deleon clay, frequently flooded, about 4.25 miles east of Eastland on Farm Road 570, then about 11.75 miles southeast on Farm Road 2214 and 100 feet north of the road, in a pasture:

A11—0 to 6 inches, dark grayish-brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate, medium, granular structure and moderate, fine,

Demona Series

The Demona series consists of deep, nearly level to gently sloping, sandy soils on uplands. These soils formed in loamy to clayey material interbedded with sandstone and shale.

In a representative profile the surface layer is very pale brown loamy sand about 14 inches thick. The subsurface layer is very pale brown loamy sand about 14 inches thick. The next layer is about 10 inches of brownish-yellow sandy clay that has red and light brownish-gray mottles. Below this is about 12 inches of light brownish-gray sandy clay that has red and yellowish-brown mottles. The underlying material is light brownish-gray, slightly acid shaly clay to a depth of 64 inches.

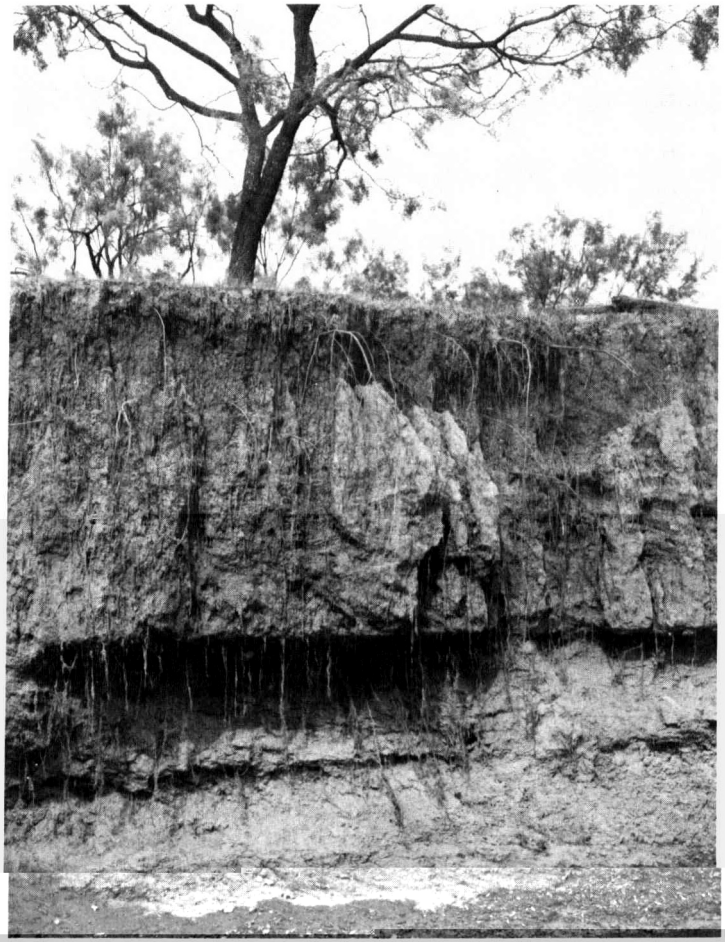
Demona soils are moderately well drained. Permeability size. Slopes are plane to convex and are weakly undulating in a few areas.

Included with this soil in mapping are spots of Chaney, Hassee, and Nimrod soils. Chaney soils are mostly on slight knolls. Hassee soils are in circular depressional areas. Nimrod soils are in areas similar to those of Demona soils. Each included area is less than 10 acres in size. Included areas make up less than 20 percent of any mapped area. Any one included soil makes up less than 15 percent.

This soil is used mostly for crops. Some areas are in improved pasture or range. Runoff is slow. The hazard of soil blowing is severe, and the hazard of erosion is slight. A perched water table is above the lower layers of sandy clay for a short period during wet seasons. Capability unit IIIe–5; Sandy range site.

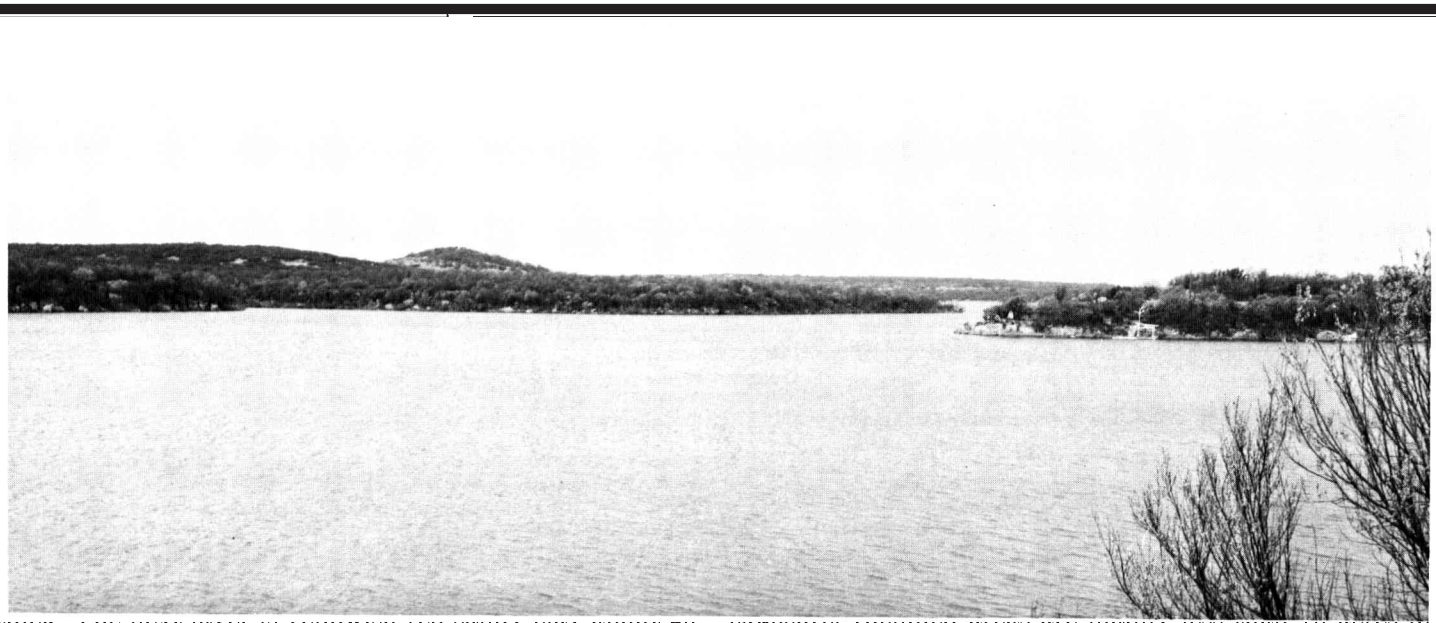
silty clay loam, clay loam, or silt loam and ranges from neutral to moderately alkaline. This horizon has stratification that ranges from very slight to distinct.

Elandco silty clay loam, frequently flooded (En).—This nearly level soil is on broad flood plains. Areas are oblong [illegible] irregular in shape and are 20 to 200 acres in size, but



medium acid. The underlying sandstone ranges from strongly cemented to indurated.

Exray-Bonti complex, 1 to 8 percent slopes (ErD).—This mapping unit is made up of gently sloping to sloping stony soils on upland ridges. Areas are irregular to elongated in shape and are 20 to 400 acres in size. The soils are commonly dissected by drainageways. They are covered by 1 to 20 percent sandstone fragments that are 1 foot to 4 feet in diameter. This mapping unit is about 61 percent Exray stony fine sandy loam, 24 percent Bonti stony fine sandy loam, and 15 percent other soils or rock outcrop. [illegible] Mapped areas are commonly about 37 percent Exray soils, but the range is 20 to 60 percent, and 51 percent other soils that are similar to Exray soils, but they are deeper over sandstone or shale or do not have lower layers of clay. These soils do not occur in all areas. The remaining 12 percent is rock outcrop. Areas are irregular in shape and are 10 to 500 acres in size. Slopes range from about 10 to 30 percent but are mainly about 20 percent. Areas of this mapping unit are much larger and are more variable in composition than are areas of most other mapping units in the county. Mapping has been controlled well enough, [illegible]



[illegible] inches thick. The underlying material is cemented sandstone.

Included with these soils in mapping are small areas of Owens and Truce soils and rock outcrop. Owens soils [illegible] size and make up 5 to 20 percent of a mapped area.

The soils in this mapping unit are suitable only as range or wildlife habitat or for recreational uses (fig. 5). Runoff is rapid following heavy rain, and the hazard of erosion is

Hassee soils are somewhat poorly drained. Permeability is very slow, and available water capacity is high. Runoff is very slow to slow. These soils receive additional water as runoff from soils in higher lying areas.

These soils are used mostly for crops. A few areas are used as range.

Representative profile of Hassee loam, 0 to 1 percent slopes, about 7 miles north and west of Gorman on Farm Road 2689 to the Kokomo Baptist Church and 0.5 mile west of the church on this road, then 0.5 mile north, 0.5 mile west, 0.4 mile north on a county road and 330 feet east of the road, in a field:

Ap—0 to 10 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; very hard, friable; neutral; clear, smooth boundary.

A2g—10 to 14 inches, light-gray (10YR 7/1) loam, gray (10YR 5/1) moist; massive; very hard, friable; neutral; abrupt, slightly wavy boundary.

B21tg—14 to 22 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; few, fine, faint, yellowish-brown mottles; coarse, medium blocky structure; extremely hard, extremely firm; continuous clay films on faces of peds; neutral; gradual, smooth boundary.

B22tg—22 to 32 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; few, fine, faint, yellowish-brown mottles; moderate, medium, blocky structure; very hard, very firm; continuous clay films on faces of peds; few, small, siliceous pebbles; few ferromanganese concretions; neutral; gradual, smooth boundary.

B3tgca—32 to 46 inches, grayish-brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate, fine, blocky structure; very hard, very firm; few small concretions of calcium carbonate; calcareous; moderately alkaline; gradual, smooth boundary.

Cca—46 to 72 inches, light brownish-gray (10YR 6/2) clay loam, grayish brown (10YR 5/2) moist; massive; underlying material is light brownish-gray, calcareous clay loam to a depth of 62 inches.

Included with this soil in mapping are spots of Thurber soils. Included areas are less than 10 acres in size and make up less than 15 percent of any mapped area.

This soil is used mostly for crops or as range. Runoff is slow, and the hazard of erosion is slight. Capability unit IIIe–1; Claypan range site.

Hensley Series

The Hensley series consists of shallow, gently sloping, loamy soils on uplands. These soils formed over thick beds of hard limestone.

In a representative profile the surface layer is reddish-brown loam about 4 inches thick. About 2 percent of the surface layer is made up of, and about 5 percent of the surface is covered by, flat limestone fragments 6 to 30 inches across the long axis. The next layer is dark reddish-brown clay about 12 inches thick. The underlying material is limestone bedrock.

Hensley soils are well drained. Permeability is slow, and available water capacity is low.

These soils are used mostly as range. A few areas are in crops.

Representative profile of Hensley loam in an area of Hensley stony loam, 1 to 5 percent slopes, about 4.5 miles southeast of Carbon on Texas Highway 6, then 2.2 miles south on a county road to an intersection, 0.4 mile south on the same county road and 81 feet west of the road, in a pasture:

A1—0 to 4 inches, reddish-brown (5YR 4/4) loam, dark

Hensley stony loam, 1 to 5 percent slopes (HnC).—

fine, subangular blocky and granular structure; very hard; very firm; many fine roots; few, fine, rounded siliceous pebbles; calcareous; moderately alkaline; clear, wavy boundary.

A12—6 to 18 inches, very dark grayish-brown (10YR 3/2) clay, very dark grayish brown (10YR 3/2) moist; moderate, fine, angular blocky structure; extremely hard, very firm; many fine roots; few, fine, rounded siliceous pebbles and limestone fragments; few soft masses of calcium carbonate in lower part; calcareous; moderately alkaline; gradual, wavy boundary.

A13—18 to 54 inches, dark-brown (10YR 3/3) clay, dark brown (10YR 3/3) moist; distinct parallelepipeds that have the long axis tilted 30 degrees from the horizontal parting to moderate fine blocky structure; extremely hard, very firm; few fine roots; prominent grooved slickensides that intersect; few fine siliceous pebbles; few strongly cemented concretions and few soft powdery masses of calcium carbonate; few streaks of grayer soil along closed cracks; calcareous; moderately alkaline; gradual, wavy boundary.

AC—54 to 64 inches, brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; moderate, medium, blocky structure; extremely hard, very firm; prominent grooved slickensides that intersect; about 5 percent soft powdery masses of calcium carbonate; many films and threads of calcium carbonate; few fine ferromanganese concretions; calcareous; moderately alkaline.

The solum ranges from 40 to 90 inches in thickness. When the soils are dry, cracks as much as 1 inch wide extend from the surface to a depth of more than 20 inches. Intersecting slickensides begin at a depth of about 16 to 24 inches. The gilgai microrelief is microknolls and microdepressions 8 to 23 feet apart. In undisturbed areas the microknolls are 3 to 12 inches higher than the microdepressions. The extremes of amplitude, or waviness, of the boundary between the A horizon and the AC horizon are about 15 to 50 inches from the center of the microknoll to the center of the microdepression. The A horizon

R—28 to 30 inches, strongly cemented limestone bedrock.

The solum ranges from 20 to 40 inches in thickness. It is 0 to

The solum ranges from 40 to 70 inches in thickness. Films, threads or soft masses of calcium carbonate are at a depth of 36 to 62 inches. The A horizon is 10 to 18 inches thick. It ranges

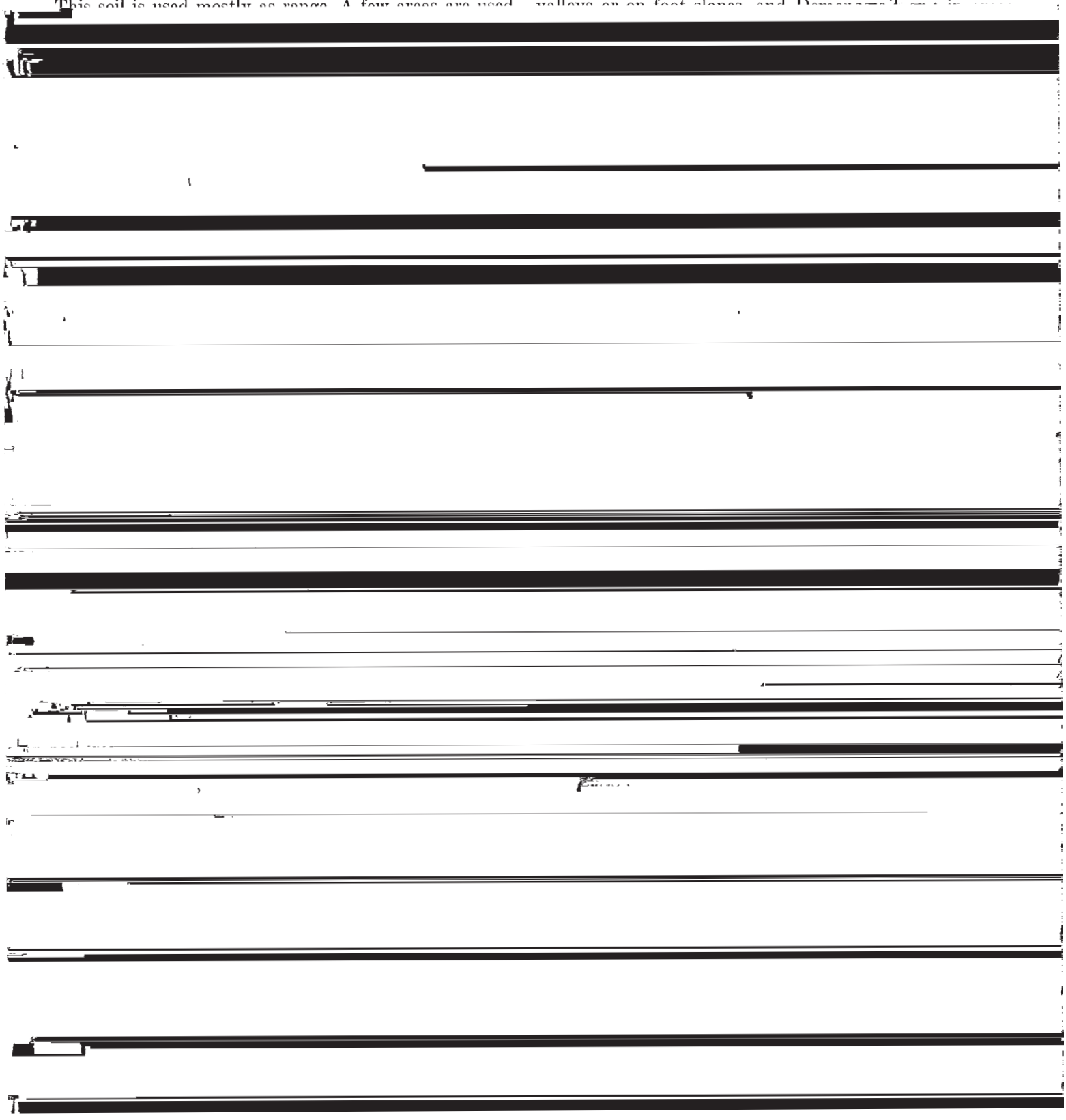
calcareous sandy clay loam that has a few soft masses and concretions of calcium carbonate. The underlying

Included with this soil in mapping are spots of Cisco and Pedernales soils. Cisco soils are on lower foot slopes. Pedernales soils are on upper slopes. Included areas are less than 5 acres in size and make up less than 20 percent of any mapped area.

This soil is used mostly as range. A few areas are used

size, but they are mainly about 30 acres. The surface is concave, convex, or plane, and slopes average about 2 percent.

Included with this soil in mapping are small areas of Cisco, Demona, and Patilo soils. Cisco soils are in shallow



Owens clay that has slopes of 3 to 5 percent. Included areas make up less than 20 percent of any mapped area. Any one included soil makes up less than 15 percent.

This soil is used mostly as range. A few small areas are cultivated. Runoff is rapid, and the hazard of erosion is severe. Capability unit IVe–1; Shallow Clay range site.

A2—6 to 46 inches, very pale brown (10YR 7/3) fine sand, pale brown (10YR 6/3) moist; single grained; loose, many roots in upper part, few in lower part; slightly acid; abrupt, wavy boundary.

B21t—46 to 56 inches, brownish-yellow (10YR 6/6) sandy clay loam, yellowish brown (10YR 5/6) moist; many, coarse, distinct mottles of red and light brownish gray; weak, coarse, blocky structure; very hard,

Figure 9.—**Lovegrass on a Patilo fine sand.**

B21t—6 to 18 inches, reddish-brown (5YR 4/4) sandy clay, dark reddish brown (5YR 3/4) moist; moderate, medium, blocky structure; very hard, very firm; few roots; discontinuous clay films on faces of peds; slightly acid; gradual, smooth boundary.

B22t—18 to 28 inches, reddish-brown (5YR 4/4) sandy clay, dark reddish brown (5YR 3/4) moist; weak, coarse, blocky structure; very hard, very firm; slightly acid; gradual, smooth boundary.

B3—28 to 40 inches, yellowish-red (5YR 5/6) sandy clay, yellowish red (5YR 4/6) moist; weak, coarse, blocky structure; very hard, very firm; few, fine, faint, yellowish mottles; neutral; clear, wavy boundary.

Cca—40 to 60 inches, pink (7.5YR 8/4) sandy clay loam, pink (7.5YR 7/4) moist; massive; very hard, firm; many soft concretions and soft masses of calcium carbonate; moderately alkaline.

underlying material is light-brown, calcareous sandy clay loam to a depth of 60 inches.

Included with this soil in mapping are spots of Chaney and Cisco soils. These soils are mostly in lower, slightly depressional areas. Included areas are less than 15 acres in size and make up less than 20 percent of any mapped area. Any one soil makes up less than 15 percent.

This soil is mostly cultivated. Some areas are in fruit and nut orchards (fig. 10). Some areas are planted to improved pasture, and a few areas are used as native range. Runoff is medium. The hazard of soil blowing is severe, and the hazard of erosion is slight. Capability unit IIIe–5; Sandy range site.

Figure 10.—**Peach orchard on a Pedernales loamy fine sand.**

irregular in shape and are 5 to 30 acres in size. Slopes are plane to convex.

The surface layer is brown, neutral fine sandy loam about 8 inches thick. The next layer is neutral sandy clay about 28 inches thick. It is red in the upper part and reddish yellow in the lower part. The underlying material to a depth of 60 inches is pinkish-gray, calcareous sandy

This soil was mostly cultivated in the past, but many areas are now planted to grass. Runoff is medium, and the hazard of erosion is severe. Capability unit IIIe-3; Tight Sandy Loam range site.

Pedernales soils, 2 to 8 percent slopes, severely eroded (PsD3).—These gently sloping to sloping soils are on uplands. They are in irregularly shaped areas 5 to 20

In a representative profile the surface layer is very dark grayish-brown, calcareous clay about 10 inches thick. From 3 to 60 percent of the surface is covered by limestone fragments 3 to 15 inches across the long axis. The underlying material is fractured, indurated, and platy limestone bedrock.

Tarrant soils are well drained. Permeability is moderately slow, and available water capacity is very low.

These soils are used as range.

Representative profile of Tarrant clay in an area of Tarrant stony clay, 1 to 8 percent slopes, 4 miles south of Carbon on Farm Road 1027, then 0.3 mile south on a county road to a gate on the west side of the road, 1 mile south on a ranch road and 300 feet west of the road:

areas along narrow drainageways. Exray soils are in narrow belts 30 to 100 feet wide that encircle hills in some areas. Included areas are 10 to 20 acres in size, and they make up as much as 40 percent of some mapped areas. Any one included soil makes up less than 20 percent of any mapped area.

The soils in this mapping unit are used as range. Runoff is rapid, and the hazard of erosion is severe. Capability unit VIIs–1; Low Stony Hills range site.

The surface layer is dark grayish-brown, slightly acid clay loam about 8 inches thick. The next layer is very dark grayish-brown, neutral clay about 15 inches thick. Below this is about 12 inches of very dark grayish-brown, calcareous clay that has a few small masses of calcium carbonate. The next layer is dark grayish-brown, calcareous clay about 8 inches thick. The underlying material is very pale brown, calcareous shaly clay to a depth of 60 inches.

Included with this soil in mapping are some small areas [illegible]

blocky structure; extremely hard, extremely firm; common distinct clay films on faces of peds; neutral; gradual, smooth boundary.

B22t—20 to 34 inches, brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; moderate, medium, blocky struc-

of the original surface layer has been removed by erosion. A few shallow gullies about 6 inches deep and 3 feet wide are in some areas.

The surface layer is brown, slightly acid fine sandy loam

Capability grouping

Capability grouping shows, in a general way, the suit-

and *c*, used in some parts of the United States but not in Eastland County, shows that the chief limitation is

residue from high residue producing crops on the surface helps to maintain a lower soil temperature, to slow runoff, and to conserve moisture. Response to applications of commercial fertilizer is good in most years.

CAPABILITY UNIT IIe-2

This unit consists of moderately deep to deep, gently sloping soils on uplands. These soils have a surface layer of fine sandy loam and lower layers of sandy clay. A crust forms on the surface when these soils are dry. The hazard of erosion is moderate. Permeability is moderately slow, and available water capacity is medium or high.

A few areas of these soils are cultivated, but most are in pasture or range. Such pasture grasses as Kleingrass or King Ranch bluestem are well suited to these soils. Sorghum and small grain are the main crops.

Controlling erosion and maintaining soil productivity and tilth are the main management objectives. A suitable cropping system is one that returns a large amount of residue to the surface layer. Terracing and contour farming help to control erosion. Response to applications of commercial fertilizer is good in most years.

CAPABILITY UNIT IIe-3

This unit consists of moderately deep to deep, gently sloping soils on uplands. These soils have a surface layer of fine sandy loam and lower layers of sandy clay loam. A crust forms on the surface when these soils are dry. The hazard of erosion is slight to moderate. Permeability is moderate, and available water capacity is medium or high.

Most areas of these soils are cultivated. The rest are in erosion is moderate. Permeability is very slow, and available water capacity is high.

Sorghum and small grain are the main crops. Small areas are in alfalfa and cotton. Such pasture grasses as Kleingrass or King Ranch bluestem are well suited to this soil.

Selecting suitable crops for this soil, controlling erosion, and maintaining tilth are the main management objectives. Terracing and contour farming help to prevent erosion. Leaving residue from high residue producing crops on the surface helps to maintain a lower soil temperature and to conserve moisture. Cultivating the soil when it is too moist compacts the surface layer and reduces the rate of water intake. Response to applications of commercial fertilizer is good in most years.

CAPABILITY UNIT IIe-6

Truce fine sandy loam, 1 to 3 percent slopes, is the only soil in this unit. This deep, gently sloping soil is on uplands. It has a surface layer of fine sandy loam and lower layers of clay. The hazard of erosion is moderate. Permeability is slow, and available water capacity is medium.

This soil is used mainly for forage sorghums. Such pasture grasses as Kleingrass and King Ranch bluestem are suited to this soil.

Controlling erosion and maintaining soil productivity and tilth are the main management objectives. A suitable cropping system is one that returns a large amount of residue to the surface layer. Leaving the residue on the surface helps to maintain tilth and a lower soil temperature and to control erosion. Terracing and contour farming help to control erosion. Response to applications

a lower soil temperature, reduce runoff, and improve tilth. Terracing and contour farming help to prevent erosion. Response to applications of commercial fertilizer is good in most years.

CAPABILITY UNIT IIIe-2

Nimrod fine sand, 0 to 5 percent slopes, is the only soil in this unit. This deep, nearly level to gently sloping soil is on uplands. It has a surface layer of fine sand and lower layers of sandy clay loam. The hazard of soil blowing is severe. Permeability is moderately slow, and available water capacity is low. The surface layer takes in water rapidly but lacks adequate storage capacity, and it is droughty if rainfall is not well distributed.

sandy clay to sandy clay loam. A crust forms on the surface when these soils are dry. The hazard of soil blowing is severe. Permeability is slow to moderate, and available water capacity is medium or high.

Peanuts, peas, sorghum, and watermelons are the main crops. Peach and pecan trees and such pasture grasses as bermudagrass and lovegrass are well suited to these soils.

Controlling soil blowing, selecting suitable crops for these soils, and maintaining and improving soil productivity are the main management objectives. A suitable cropping system is one that returns a large amount of residue to the surface layer. Cover cropping, fertilizing

[redacted]

Peanuts, peas, sorghum, and watermelons are the main crops. Some areas are in vineyards, peach orchards, and pecan orchards. Such pasture grasses as bermudagrass and lovegrass are well suited to this soil.

Controlling soil blowing and selecting suitable crops for these soils are the main management objectives. A suitable cropping system is one that returns a large amount

and stripcropping help to prevent erosion and improve soil productivity.

CAPABILITY UNIT IIIe-6

Hensley loam, 1 to 3 percent slopes, is the only soil in this unit. This shallow, gently sloping soil is on uplands. It has a surface layer of loam and a lower layer of clay. The hazard of erosion is moderate. Permeability is slow,

A suitable cropping system is one that includes closely growing, high residue producing crops. Leaving the residue on the surface helps to reduce runoff, conserve moisture, and maintain tilth. Terracing and contour farming help to prevent erosion. Response to applications of commercial fertilizer is good in most years.

CAPABILITY UNIT IIIw-1

Hassee loam, 0 to 1 percent slopes, is the only soil in this unit. This deep, nearly level soil is on uplands. It has a surface layer of loam and lower layers of clay. A crust forms on the surface when this soil is dry, and permeability is very slow. The permeability and crustiness make this soil difficult to use and manage. The hazard of erosion is slight. Available water capacity is high.

[redacted]

shallow gullies in some areas. Permeability is very slow, and available water capacity is low.

The choice of crops is mostly restricted to forage sorghum. This soil is not well suited to row crops. Such pasture grasses as Kleingrass and King Ranch bluestem are suited.

Controlling erosion and selecting suitable crops for this soil are the main management objectives. A suitable cropping system is one that includes closely spaced, high residue producing crops. Leaving the residue on the surface helps to reduce runoff, conserve moisture, and maintain tilth. Terracing and contour farming help to prevent erosion. Response to applications of commercial fertilizer is good in most years.

CAPABILITY UNIT IVe-2

[redacted]

clay. The hazard of erosion is slight to severe. Permeability is slow to moderately slow, and available water capacity is very low to medium.

The soils in this unit are too stony for cultivated crops. They are better suited to use as range or wildlife habitat than to most other uses.

CAPABILITY UNIT VIIs-1

This unit consists of very shallow to shallow, gently sloping to moderately steep and hilly soils on uplands. These soils have a surface layer of fine sandy loam to clay and lower layers of loam to clay. The hazard of erosion is slight to severe. Permeability is very slow to moderately slow, and available water capacity is low and very low.

The soils in this unit are too steep and stony for cultivation. They are better suited to use as range or wildlife habitat than to most other uses.

Predicted yields

The predicted yields of the principal crops grown in Eastland County are given in table 2. The predictions are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The predicted yields are average yields per acre that can be expected by good commercial farmers at the level of management that tends to produce the highest economic returns. The yields are given for dryland soils. Soils that are used only as range or for recreation are not listed in this table. Crops other than those shown in table 2 are grown in the county, but their predicted yields are not included, because their acreage is small or reliable data on yields are not available.

The predicted yields given in table 2 can be expected if the following management practices are used on dryland and irrigated soils:

1. Rainfall is effectively used and conserved.
2. A surface or subsurface drainage system, or both, are installed.
3. Crop residue is managed to maintain soil tilth.
4. Tillage is minimal but timely.
5. Insect, disease, and weed control measures are consistently used.
6. Fertilizer is applied according to soil test and crop needs.
7. Suited crop varieties are used at recommended seeding rates.

TABLE 2.—*Predicted average acre yields of principal crops*

[Absence of a figure indicates that the crop is not commonly grown on the specified soil]

Soil	Peanuts (dryland)	Grain sorghum	Oats	Forage sorghum	Coastal bermudagrass
	Lb	*Lb*	*Bu*	*AUM*[1]	*AUM*[1]
Bolar clay loam, 1 to 3 percent slopes		2,500	40	4.0	
Bonti fine sandy loam, 1 to 3 percent slopes		2,000	40	5.0	4.0
Bunyan fine sandy loam	1,200	3,000	50	6.0	6.0
Bunyan soils, frequently flooded					6.0
Chaney loamy sand, 1 to 5 percent slopes	1,200	2,000		6.0	6.0
Chaney loamy sand, 1 to 5 percent slopes, eroded	1,000	2,000		5.0	5.0
Cisco loamy fine sand, 1 to 5 percent slopes	1,200	2,000		6.0	6.0
Cisco fine sandy loam, 1 to 3 percent slopes	1,000	2,000	40	6.0	6.0
Cisco fine sandy loam, 3 to 5 percent slopes	800	1,700	30	5.0	5.0
Cisco fine sandy loam, 1 to 5 percent slopes, eroded	800	1,500		4.0	4.5
Deleon clay, frequently flooded					4.5
Demona loamy sand, 0 to 5 percent slopes	1,200	2,250		6.0	6.0
Elandco silty clay loam	1,000	3,000	50	6.0	6.0
Elandco silty clay loam, frequently flooded					6.0
Hassee loam, 0 to 1 percent slopes		2,000	30	4.0	
Hassee loam, 1 to 2 percent slopes		2,000	30	4.0	4.0
Hensley loam, 1 to 3 percent slopes		1,500	35	5.0	4.0
Lamar loam, 2 to 5 percent slopes		2,500	35	5.0	5.5
Lamar loam, 5 to 8 percent slopes		2,000	30	4.5	4.5

Footnote at end of table

TABLE 2.—*Predicted average acre yields of principal crops*—Continued

Soil	Peanuts (dryland)	Grain sorghum	Oats	Forage sorghum	Coastal bermudagrass
	Lb	*Lb*	*Bu*	*AUM*[1]	*AUM*[1]
Leeray clay, 0 to 1 percent slopes	----------	3, 000	40	3. 0	----------
Leeray clay, 1 to 3 percent slopes	----------	2, 500	40	3. 0	----------
Lindy loam, 1 to 3 percent slopes	----------	2, 500	40	5. 0	5. 0
May fine sandy loam, 0 to 1 percent slopes	1, 200	3, 000	50	6. 0	6. 0
May fine sandy loam, 1 to 3 percent slopes	1, 200	2, 500	50	6. 0	6. 0
Menard fine sandy loam, 1 to 3 percent slopes	1, 000	1, 800	40	5. 5	5. 5
Menard fine sandy loam, 3 to 5 percent slopes	800	1, 500	30	5. 0	5. 0
Nimrod fine sand, 0 to 5 percent slopes	1, 050	2, 000	----------	6. 0	5. 0
Owens clay, 1 to 3 percent slopes	----------	1, 500	15	2. 0	----------
Patilo fine sand, 0 to 3 percent slopes	750	1, 500	----------	4. 0	4. 0
Pedernales loamy fine sand, 1 to 5 percent slopes	1, 000	2, 000	----------	6. 0	6. 0
Pedernales fine sandy loam, 1 to 3 percent slopes	1, 000	2, 000	40	5. 0	4. 0
Pedernales fine sandy loam, 3 to 5 percent slopes	800	2, 000	30	4. 0	4. 0
Pedernales fine sandy loam, 1 to 5 percent slopes, eroded	750	2, 000	30	4. 0	4. 0
Thurber clay loam, 0 to 1 percent slopes	----------	1, 750	35	4. 5	4. 0
Thurber clay loam, 1 to 3 percent slopes	----------	1, 750	35	4. 5	4. 0
Truce fine sandy loam, 1 to 3 percent slopes	----------	2, 000	30	3. 0	3. 5
Truce fine sandy loam, 3 to 5 percent slopes	----------	1, 750	20	2. 5	4. 0
Truce fine sandy loam, 1 to 5 percent slopes, eroded	----------	1, 500	15	2. 0	3. 0

[1] AUM stands for animal-unit-month, a term used to express the amount of forage or feed required to maintain one animal unit, 1,000 pounds live weight, for a period of 30 days.

Range [2]

About 375,900 acres in Eastland County is native range, which makes up about 61 percent of the total agricultural land. At the time of the survey, 48 ranch units were in operation. Most of the ranches are operated as cow-calf enterprises. Many ranchers supplement their operations with winter stockers or carryover calves. Most ranches have some areas in crops and some in pasture. The cultivated areas are used to grow supplemental forage that is either grazed or stored as silage or hay. Improved

with buffalograss and annual grasses. The tight sandy loams now produce buffalograss, Texas grama, and three-awn. Mesquite is rapidly invading these sites. Bluestem still grows on the sands, but the vegetation is dominantly dropseed, silver bluestem, three-awn, and shin oak.

Range sites and condition classes

Soils differ in their capacity to produce grass and other plants for grazing. Soils that produce about the same kind and amount of forage, if the range is in similar condition,

Increasers are plants in the climax vegetation that increase in relative amount as the more desirable decreaser plants are reduced by close grazing. They are py cover. If overgrazing is prolonged, annual weeds and annual grasses make up a substantial part of the annual production, and the total production is reduced.

broomweed, regardless of the amount of vegetative cover.

side-oats grama, vine-mesquite, Canada wildrye, and Texas cupgrass decrease in the plant community. Texas

wheatgrass; 5 percent Texas wintergrass; 5 percent tall dropseed; 5 percent meadow dropseed; 5 percent perennial three-awn; 5 percent sand dropseed; 5 percent white tridens; and 5 percent silver bluestem. Such forbs as heath aster, Engelmanndaisy, greenthread, catclaw sensitivebrier, Maximilian sunflower, and western ragweed make up 5 percent of the yield.

If the site is continuously heavily grazed by cattle, silver bluestem, side-oats grama, and white tridens decrease in the plant community. Such plants as buffalograss, curly mesquite, and Texas wintergrass increase. If overgrazing is prolonged, mesquite, condalia, tasajillo, pricklypear, ragweed, annual weeds, and annual grasses invade the site, and the total production is greatly reduced.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 3,500 pounds in wet years to 2,000 pounds in dry years. Approximately 95 percent of this production is from plants that furnish forage for cattle or sheep.

DEEP REDLAND RANGE SITE

Lindy loam, 1 to 3 percent slopes, is the only soil in this range site. This moderately deep, gently sloping loamy soil is on uplands. It is well drained. Permeability is slow, and available water capacity is medium.

If this site is in climax condition, it is a mixture of tall and mid grasses and forbs. Live oak and post oak trees are in a few areas. Annual production, by weight, is 20 percent indiangrass; 25 percent little bluestem; 10 percent big bluestem; 10 percent side-oats grama; 10 percent Texas cupgrass; 5 percent cane bluestem; 5 percent tall dropseed; 5 percent Texas wintergrass; and 5 percent buffalograss. Such forbs as wild vetch, sida, filaree, trailing ratany, Engelmanndaisy, and bushsunflower make up 5 percent.

If the site is continuously heavily grazed, tall and mid grasses, such as side-oats grama, cane bluestem, vine-mesquite, Engelmanndaisy, and bushsunflower, decrease in the plant community. Such plants as Texas wintergrass, buffalograss, and silver bluestem increase. Continued overgrazing causes an increase in such grasses as perennial three-awn, hairy tridens, and Texas grama and such kinds of brush as live oak, tasajillo, pricklypear, greenbrier, and elbowbush. If overgrazing is prolonged, annual weeds

grass and big bluestem; 5 percent purpletop tridens; 5 percent fringeleaf pasapalum; 5 percent Scribner's panicum; 10 percent annual grasses; 15 percent post oak; 10 percent blackjack oak; 5 percent bumelia; 5 percent greenbrier; and 5 percent skunkbush sumac and prickly-ash. Such forbs as trailing wildbean, lespedeza, erect dayflower, oenothera, and bundleflower make up about 15 percent of the yield.

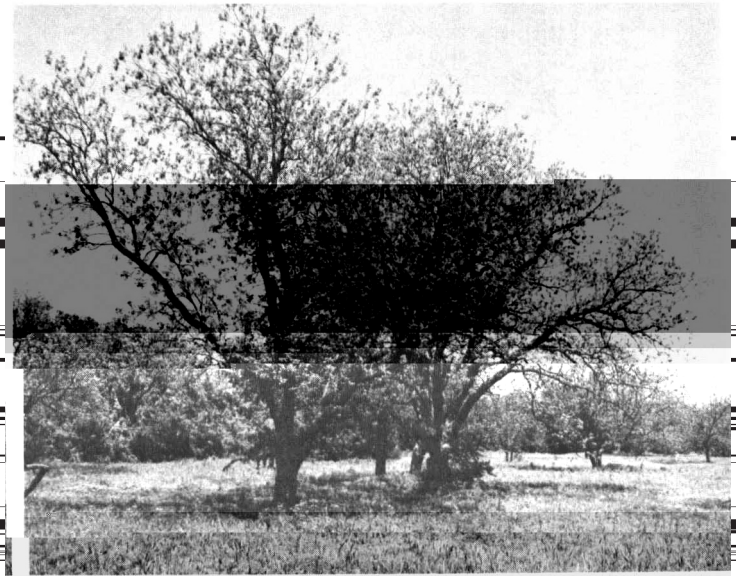
If the site is continuously heavily grazed by cattle, sand lovegrass, indiangrass, big bluestem, and purpletop tridens decrease. Brush, particularly oak, frequently increases and dominates the site.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 3,000 pounds in wet years to 1,000 pounds in dry years. Approximately 55 percent of this production is from plants that furnish forage for cattle or goats.

LOAMY BOTTOMLAND RANGE SITE

This range site is made up of deep, nearly level, loamy soils on floods plains (fig. 13). These soils are well drained. Permeability is moderate, and available water capacity is high. The soils are flooded at intervals ranging from one or more times each year to once every 4 to 10 years.

If this site is in climax condition, it is a savanna that has tall grass and a 10 to 15 percent canopy of tall trees along streams. Pecan is the main kind of woody plant along the larger streams, and elm and live oak are the main ones along the smaller streams. Annual production, by weight, is 20 percent indiangrass; 15 percent little bluestem; 10 percent big bluestem; 15 percent switchgrass; 5 percent side-oats grama; 5 percent meadow dropseed and Canada wildrye; 5 percent vine-mesquite; 5 percent Texas wintergrass; and 5 percent tall dropseed. Such kinds of woody plants as pecan, elm, live oak, and hackberry make up 10 percent, and such forbs as Engelmanndaisy, catclaw sensitivebrier, Maximilian sunflower, trailing wildbean, baldwin ironweed, and western ragweed make up 5 percent.



If the site is continuously heavily grazed, tall grasses decrease. Side-oats grama, hairy dropseed, meadow dropseed, Texas wintergrass, and vine-mesquite increase. Western ragweed, nightshade, and buffalograss invade. If overgrazing is prolonged, this site eventually regresses to a dense stand of brush and invading forbs.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 7,000 pounds in wet years to 3,700 pounds in dry years. Approximately 85 percent of this production is from plants that furnish forage for cattle or goats.

LOW STONY HILLS RANGE SITE

This range site is made up of very shallow to shallow, gently sloping to sloping and hilly, clayey soils on uplands. These soils are well drained. Permeability is moderately slow, and available water capacity is very low.

If this site is in climax condition, it is a mixture of tall and mid grasses, and motts of brush and trees are scattered throughout. Annual production, by weight, is 20 percent little bluestem; 10 percent indiangrass; 10 percent side-oats grama; 10 percent tall dropseed; 5 percent big bluestem; 5 percent green sprangletop; 5 percent Texas wintergrass; 5 percent Texas cupgrass; 5 percent slender [illegible] and 5 percent cane bluestem. Live oak, Texas daisy, yellow neptunia, sensitivebrier, bushsunflower, and orange zexmenia make up about 5 percent.

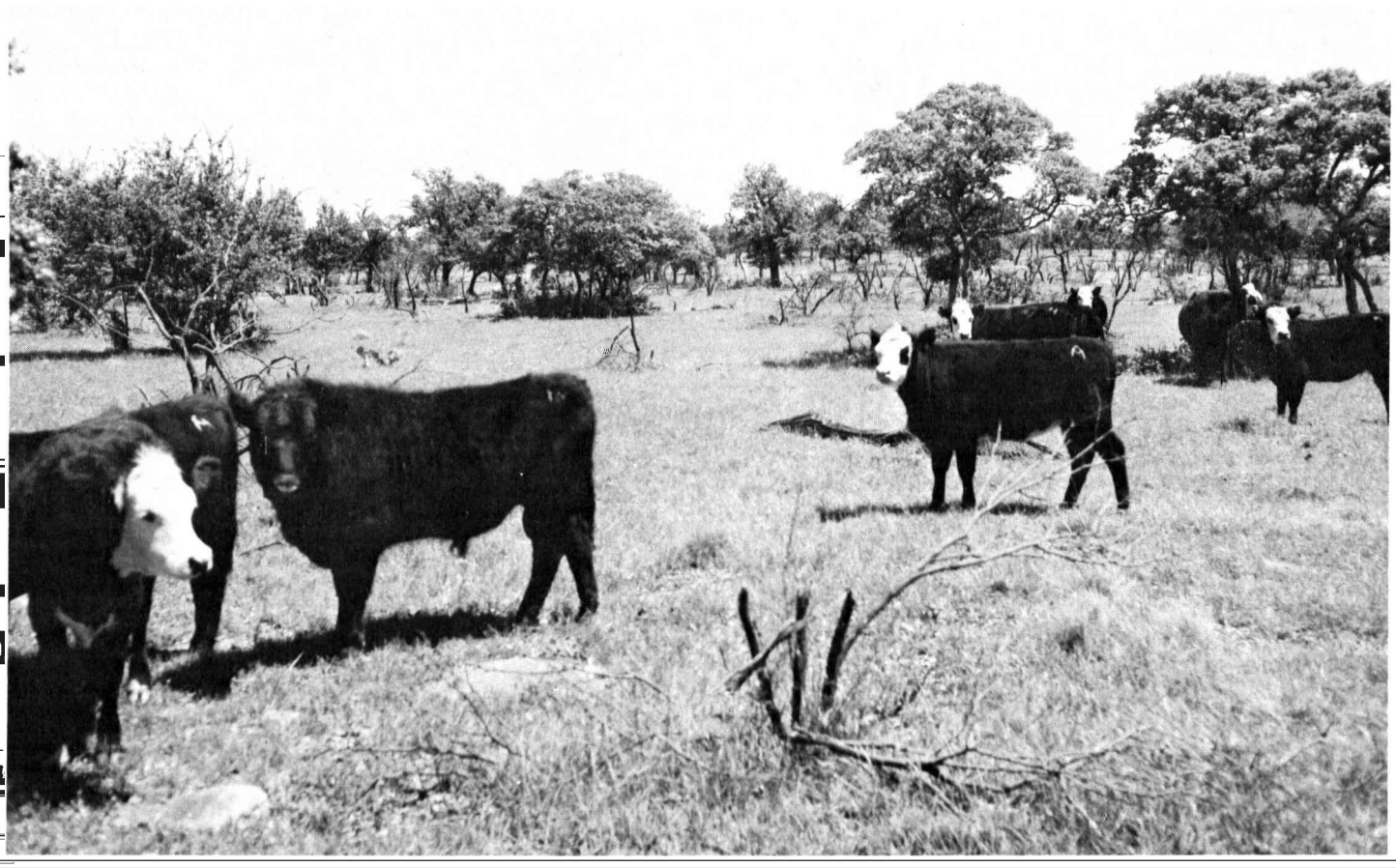
If the site is continuously heavily grazed, brush and perennial three-awns increase. Hairy tridens and Texas grama invade. Desirable forbs, such as Engelmanndaisy, yellow neptunia, sensitivebrier, heath aster, and bushsunflower, are replaced by annual broomweed and upright prairie coneflower, and production is reduced as much as 1,000 pounds per acre.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 1,700 pounds in wet years to 900 pounds in dry years. Approximately 80 percent of this production is from plants that furnish forage for cattle or goats.

REDLAND RANGE SITE

This range site is made up of shallow, gently sloping, loamy soils on uplands (fig. 14). These soils are well drained. Permeability is slow, and available water capacity is low.

If this site is in climax condition, it is a mixture of tall and mid grasses, forbs, and live oak trees. Annual production, by weight, is 30 percent little bluestem; 10 percent indiangrass; 10 percent big bluestem; 10 percent side-oats grama; 5 percent tall dropseed; 5 percent vine-



bumelia, and elm make up 5 percent. Such forbs as Englemanndaisy, indian mallow, sagewort, purple prairie-clover, and bushsunflower make up 5 percent.

If the site is continuously heavily grazed by cattle, little bluestem, big bluestem, indiangrass, Englemann-daisy, bushsunflower, purple prairie-clover, and sagewort decrease. Texas cupgrass, Texas wintergrass, and side-oats grama increase, then decrease when overgrazing is continued. If overgrazing is prolonged, such brush as mesquite and juniper and such plants as perennial three-awn and annual weeds make up a substantial part of the annual yield, and production is reduced as much as 2,000 pounds per acre.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 5,000 pounds in wet years to 2,700 pounds in dry years. Approximately 90 percent of this production is from plants that furnish forage for cattle and goats.

SANDY RANGE SITE

This range site is made up of deep, nearly level to sloping and gently undulating, sandy soils on uplands. These soils are moderately well drained to well drained. Permeability is slow to moderately slow, and available water capacity is low to high.

If this site is in climax condition, it is a post oak and blackjack oak savanna. Post oak is the dominant kind of woody plant. Tall grasses and some mid grasses make up the understory, and an abundant variety of forbs is

yield, and skunkbush, greenbrier, bumelia, pricklyash, hackberry, poison-oak, and blackhaw make up 5 percent. Such forbs as erect dayflower, trailing wildbean, lespedeza, and prairie-clover make up about 5 percent.

If the site is continuously heavily grazed by cattle, little bluestem, sand lovegrass, indiangrass, big bluestem, and purpletop tridens decrease in the plant community. Such plants as dropseed, hairy grama, and silver bluestem increase. If overgrazing is prolonged, fringeleaf paspalum, silverleaf nightshade, gummy lovegrass, tumble lovegrass, and annual grasses invade. Blackjack oak and post oak increase in some areas and shade this site, which prevents grass growth (fig. 15).

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 4,000 pounds in wet years to 2,000 pounds in dry years. Approximately 80 percent of this production is from plants that furnish forage for cattle or goats.

SANDY LOAM RANGE SITE

This range site is made up of deep to very shallow, nearly level to sloping, loamy soils on uplands. These soils are well drained. Permeability is moderate to moderately slow, and available water capacity is low to high.

If this site is in climax condition, it is an open savanna of post oak and blackjack oak trees and an understory of tall and mid grasses. Annual production, by weight, is 30 percent little bluestem; 10 percent big bluestem; 10 percent indiangrass; 10 percent side-oats grama; 5 percent

Engelmanndaisy, bundleflower, skunkbush sumac, dalea, and prairie-clover make up 10 percent.

If the site is continuously heavily grazed by cattle, little bluestem, indiangrass, big bluestem, switchgrass, and purpletop tridens decrease in the plant community. Such plants as side-oats grama, hooded windmillgrass, and Texas wintergrass increase. If overgrazing is prolonged, annual weeds and woody plants make up a substantial part of the annual production, and the total production

If the site is continuously heavily grazed by cattle, indiangrass, little bluestem, switchgrass, and sand lovegrass decrease in the plant community. Such plants as side-oats grama and silver bluestem increase. If overgrazing is prolonged, annual weeds and woody plants make up a substantial part of the annual production, and the total production is greatly reduced.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 5,000

community. Such plants as buffalograss, curly mesquite, and Texas wintergrass increase. If overgrazing is prolonged, three-awns, condalia, hairy tridens, small mesquite, pricklypear, and tasajillo invade.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 1,700 pounds in wet years to 900 pounds in dry years. Approximately 90 percent of this production is from plants that furnish forage for cattle.

STEEP ADOBE RANGE SITE

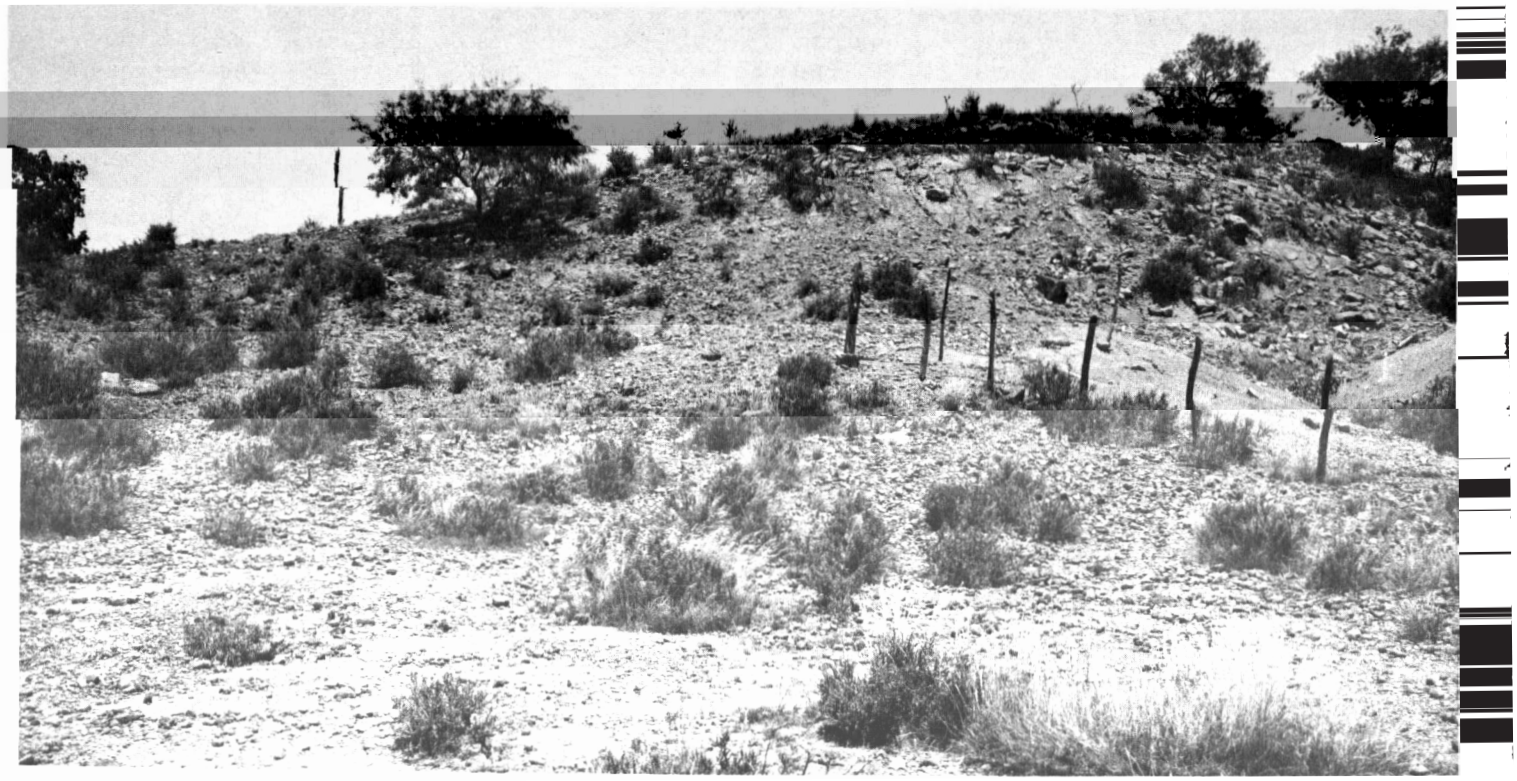
Only Brackett complex, 8 to 20 percent slopes, is in this range site. These shallow, strongly sloping to moderately steep, loamy soils are on uplands (fig. 18). The soils are well drained. Permeability is moderately slow, and avail-

queen's-delight increase. If overgrazing is prolonged, annual weeds and annual grasses make up a substantial part of the annual production, and the total production is reduced.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 2,500 pounds in wet years to 1,500 pounds in dry years. Approximately 75 percent of this production is from plants that furnish forage for cattle or goats.

TIGHT SANDY LOAM RANGE SITE

This range site is made up of moderately deep to deep, loamy soils on uplands. These soils are well drained. Permeability is slow to moderately slow, and available water capacity is medium or high.



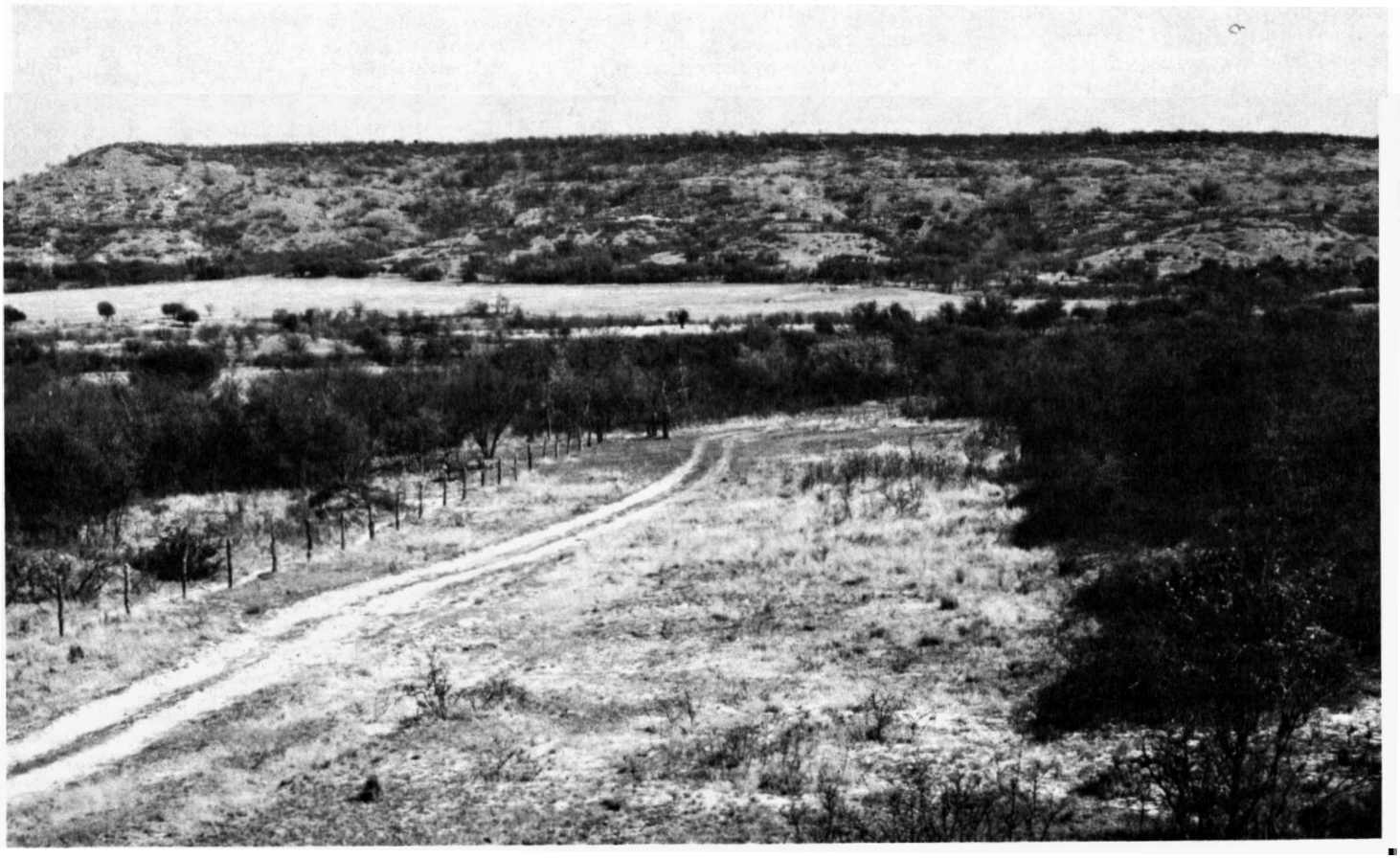


Figure 18.—**Area of Lamar soils in foreground and of stony Brackett soils in background.**

oak does not invade this site as readily as does condalia, tasajillo, and mesquite.

Where this site is in excellent condition, the average annual acre yield of air-dry herbage ranges from 3,500 pounds in wet years to 2,000 pounds in dry years. Approximately 70 percent of this production is from plants that furnish forage for cattle or sheep.

Wildlife [3]

Soils directly influence the kind and amount of vegeta-

rockiness, (6) hazard of flooding, (7) slope, and (8) permeability of the soil to air and water.

In table 3, the soils of Eastland County are rated according to their suitability for producing six elements of wildlife habitat and for three groups, or kinds, of wildlife. The ratings indicate relative suitability for various elements. A rating of *good* indicates that habitat is generally easily created, improved, or maintained. The soil has few or no limitations that affect management, and satisfactory results can be expected when the soil is used for

TABLE 3.—*Suitability of the soils for elements of wildlife habitat and for kinds of wildlife*

Soil series and map symbols	Elements of wildlife habitat						Kinds of wildlife		
	Grain and seed crops	Domestic grasses and legumes	Wild herbaceous plants	Shrubs	Wetland food and cover plants	Shallow water developments	Open-land	Rangeland	Wetland
Bolar: BcB	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Bonti: BnB	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Brackett:									
Brd	Poor	Poor	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor.
BtE	Very poor	Very poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Bunyan:									
Bu	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
By	Very poor	Poor	Fair	Good	Poor	Very poor	Poor	Fair	Very poor.
Chaney:									
ChC, ChC2, CnD3	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CmD	Poor	Poor	Good	Good	Poor	Very poor	Fair	Good	Very poor.
Cisco:									
CoC	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
CsB	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
CsC, CsC2	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Deleon: De	Very poor	Poor	Poor	Good	Poor	Poor	Poor	Fair	Poor.
Demona: DmC	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Elandco:									
Ea	Good	Good	Fair	Good	Poor	Very poor	Good	Fair	Very poor.
En	Very poor	Poor	Fair	Good	Poor	Very poor	Poor	Fair	Very poor.
Exray:									
ErD	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
For Bonti part of ErD, see Bonti series.									
ESE	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Hassee: HaA, HaB	Fair	Fair	Good	Fair	Fair	Fair	Good	Fair	Fair.
Hensley: HeB, HnC	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
Lamar: LaC, LaD	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Leeray: LeA, LeB	Good	Good	Poor	Fair	Poor	Good	Fair	Fair	Fair.
Lindy: LnB	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
May: MfA, MfB	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Menard: MnB, MnC	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
Nimrod: NmC	Poor	Good	Good	Good	Poor	Very poor	Fair	Good	Very poor.
Owens:									
OcB	Fair	Good	Poor	Fair	Poor	Very poor	Fair	Fair	Very poor.

A rating of *poor* indicates that habitat can be created, improved, or maintained in most places, but the soil has severe limitations. Management is difficult, expensive, and requires intensive effort. Results are questionable.

A rating of *very poor* indicates that under the prevailing soil conditions, it is impractical to attempt to create, improve, or maintain habitat. Soil conditions are very unfavorable, and results are probable.

meadowlark, field sparrow, cottontail rabbit, jackrabbit, and fox are typical examples of open-land wildlife.

Rangeland wildlife consists of birds and mammals that normally live in areas of natural rangeland. Antelope, bobcat, bunting, chukar, coyote, deer, meadowlark, quail, and raccoon are typical examples of rangeland wildlife.

Wetland wildlife consists of birds and mammals that

This information, however, does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to a depth greater than those shown in the tables, generally a depth of more than 6 feet. In addition, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have different meanings in soil science than in engineering. Many of these terms commonly used in soil science are defined in the Glossary.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified soil classification system,[5] used by the SCS engineers, Department of Defense, and others, and the AASHTO system,[6] adopted by the American Association of State Highway

Estimated soil properties significant to engineering

Several estimated soil properties significant to engineering are given in table 4. These estimates are made for typical soil profiles by layers sufficiently different to behave in a different way when used for engineering purposes. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. In the following paragraphs the columns in table 4 are explained.

In the column headed "Hydrologic group," the runoff potential from rainfall is given. Four major soil groups are used, and the soils are classified on the basis of intake of water at the end of long-duration storms that occur after prior wetting and opportunity for swelling and without the protective effects of vegetation.

The major soil groups are briefly described in the following paragraphs.

Group A consists of soils that have a high infiltration rate even when thoroughly wetted. They are chiefly deep, well-drained to excessively drained sand or gravel, or

TABLE 4.—*Estimates of soil*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils for referring to other series that appear in the first column of this table. The symbol > means more

Soil series and map symbols	Hydrologic group	Depth to bedrock	Depth from surface	Dominant USDA texture	Classification		Coarse fraction greater than 3 inches
					Unified	AASHTO	
		In	*In*				*Pct*
Bolar: BcB	C	20 to 40	0–12	Clay loam	CL	A–6, A–7	0–5
			12–38	Clay loam	CL	A–6, A–7	0–10
			38–40	Fractured hard limestone bedrock.			
Bonti: BnB	C	20 to 40	0–6	Fine sandy loam	CL–ML, SC, SM, SM–SC, ML	A–4, A–2	0–25
			6–26	Sandy clay	CL	A–6, A–7	0–4
			26–28	Strongly cemented sandstone.			
Brackett: Brd, BtE	C	10 to 20	0–6	Loam	SC, CL	A–6	1–10
			6–16	Loam	SC, CL	A–6	1–8
			16–40	Limy loam interbedded with soft limestone and sandstone fragments.			
Bunyan: Bu, By	B	>72	0–8	Fine sandy loam	SC, CL	A–4, A–6	
			8–24	Sandy clay loam	SC, CL	A–4, A–6	
			24–40	Fine sandy loam	SC, CL	A–4, A–6	
			40–46	Sandy clay loam	SC, CL	A–4, A–6	
			46–60	Fine sandy loam	SC, CL	A–4, A–6	
Chaney: ChC, ChC2, CmD, CnD3	C	>72	0–12	Loamy sand	SM, SM–SP	A–3, A–2–4	0–20
			12–48	Sandy clay	CL, CH	A–7	0–10
			48–60	Sandy clay loam	CL	A–6, A–7	0–10
Cisco:							
CoC	B	>72	0–10	Loamy fine sand	SM	A–4, A–2–4	
			10–50	Sandy clay loam	SC	A–6	
			50–70	Fine sandy loam	SC	A–4, A–6	
CsB, CsC, CsC2	B	>72	0–12	Fine sandy loam	SM, ML, SM–SC, CL–ML	A–4	
			12–60	Sandy clay loam	SC, CL	A–6	
Deleon: De	C	>72	0–44	Clay	CH, CL	A–7–6	
			44–64	Silty clay loam	CL, CH	A–7, A–6	
Demona: DmC	C	>72	0–28	Loamy sand	SM, SM–SC	A–2–4	
			28–50	Sandy clay	CL, CH	A–7	
			50–64	Shaly clay.			
[redacted]							

properties significant in engineering

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions than; the symbol < means less than. Absence of data indicates that no estimate was made]

[redacted]

TABLE 4.—*Estimates of soil*

Soil series and map symbols	Hydrologic group	Depth to bedrock	Depth from surface	Dominant USDA texture	Classification		Coarse fraction greater than 3 inches
					Unified	AASHTO	
		In	*In*				*Pct*
Lamar: LaC, LaD	B	>72	0–60	Loam	CL, CL–ML	A–4, A–6	0–2
Leeray: LeA, LeB	D	>72	0–54	Clay	CH	A–7–6	0–2
			54–64	Clay	CH, CL	A–7–6	0–2
Lindy: LnB	C	20 to 40	0–6	Loam	CL	A–4, A–6	0–5
			6–28	Clay	CL, CH	A–7	0–5
			28–30	Strongly cemented limestone.			
May: MfA, MfB	B	>72	0–14	Fine sandy loam	CL, SC, CL–ML, SM–SC	A–4	
			14–48	Sandy clay loam	SC, CL	A–6	
			48–60	Loam	SC, CL	A–4, A–6	
Menard: MnB, MnC	B	>72	0–6	Fine sandy loam	SM, SM–SC, ML, CL–ML	A–4	
			6–31	Sandy clay loam	SC, CL	A–6	
			31–64	Sandy clay loam	SC, CL	A–4, A–6	0–5
Nimrod: NmC	C	>72	0–30	Fine sand	SP–SM, SM	A–2–4, A–3	
			30–72	Sandy clay loam	SC, CL	A–2–6, A–6	

properties significant in engineering—Continued

Percentage passing sieve—				Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity to—	
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)							Uncoated steel	Concrete
						In per hr	*In per in of soil*	*pH*			
95–100	95–100	90–100	70–80	20–35	6–12	0. 6–2. 0	0. 12–0. 15	7. 9–8. 4	Low	Moderate	Low.
95–100	95–100	85–100	75–95	51–70	30–45	<0. 06	0. 12–0. 18	7. 9–8. 4	Very high	High	Low.
95–100	95–100	85–100	70–95	41–60	25–40	<0. 06	0. 10–0. 15	7. 9–8. 4	Very high	High	Low.
80–100	85–98	85–95	60–75	20–40	10–20	0. 60–2. 0	0. 12–0. 14	6. 1–7. 3	Low	Low	Low.
90–100	90–100	90–98	65–80	41–55	20–30	0. 06–0. 20	0. 16–0. 20	6. 1–7. 3	Moderate	High	Low.
95–100	95–100	80–95	40–60	20–30	4–10	2. 0–6. 0	0. 11–0. 15	6. 1–7. 8	Low	Low	Low.
95–100	95–100	80–100	40–75	30–40	15–25	0. 6–2. 0	0. 12–0. 20	6. 6–7. 8	Moderate	High	Low.
95–100	95–100	75–95	40–75	20–40	8–25	0. 6–2. 0	0. 11–0. 20	7. 9–8. 4	Moderate	High	Low.
95–100	95–100	75–90	40–60	<25	NP–7	2. 0–6. 0	0. 11–0. 17	6. 6–7. 8	Low	Low	Low.
95–100	95–100	80–100	36–60	30–40	12–22	0. 6–2. 0	0. 15–0. 19	6. 1–8. 4	Low	High	Low.
80–95	75–95	65–80	40–55	20–35	8–20	2. 0–6. 0	0. 11–0. 17	7. 9–8. 4	Low	High	Low.
95–100	95–100	90–100	8–20	<25	NP–3	6. 0–20. 0	0. 05–0. 10	5. 6–7. 3	Very low	Low	Low.
95–100	95–100	90–100	25–55	20–35	11–20	0. 2–0. 6	0. 14–0. 17	5. 1–6. 0	Low	High	Moderate.
95–100	95–100	90–100	80–95	45–60	20–30	<0. 06	0. 13–0. 17	7. 9–8. 4	High	High	Low.
90–100	85–100	80–100	55–95	40–55	25–35	<0. 06	0. 03–0. 08	7. 9–8. 4	High	High	Low.
100	95–100	90–100	8–20	<25	NP–3	6. 0–20. 0	0. 05–0. 08	6. 1–7. 3	Very low	Low	Low.
90–100	90–100	90–100	25–50	20–35	11–20	0. 2–0. 6	0. 14–0. 18	5. 1–6. 5	Low	Low	Moderate.

TABLE 5.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in for referring to other series that appear

Soil series and map symbols	Degree and kind of limitation for—					
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill [1]	Local roads and streets
[illegible]	[illegible]	[illegible]	[illegible]	Moderate:	Severe: rip-	Severe: low

interpretations

such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions in the first column of this table]

Degree and kind of limitation for—		Suitability as a source of—		Soil features affecting—		
Pond reservoir areas	Pond embankments	Road fill	Topsoil	Irrigation	Terraces and diversions	Waterways
Severe: bedrock at a depth of 20 to 40 inches.	Moderate: 20 to 40 inches of borrow material.	Poor: low load-supporting capacity.	Fair: 10 to 20 inches of clay loam.	Depth of soil-----	All features favorable.	All features favorable.
Severe: bedrock at a depth of 20 to 40 inches.	Moderate: 20 to 40 inches of borrow material.	Poor: 20 to 40 inches of material.	Fair: 4 to 12 inches of material.	Depth of soil-----	All features favorable.	All features favorable.
Severe: permeable substratum.	Moderate: medium compressibility; fair resistance to erosion.	Poor: 10 to 20 inches of material.	Poor: 40 to 60 percent calcium carbonate equivalent.	Depth of soil; slope; stoniness.	Depth of soil; slope; stoniness.	Depth of soil; slope; stoniness.
Severe: permeable sub-	Moderate: medium com-	Poor: 10 to 20 inches of	Poor: 40 to 60 percent calcium	Depth of soil; slope; stoni-	Depth of soil;	Depth of soil;

TABLE 5.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—					
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill [1]	Local roads and streets
Cisco:						
CoC	Moderate: moderate permeability.	Moderate: moderate permeability; slope of 1 to 5 percent.	Slight	Moderate: moderate shrink-swell potential.	Moderate: loamy fine sand.	Moderate: low strength; moderate shrink-swell potential.
CsB, CsC, CsC2	Moderate: moderate permeability.	Moderate: moderate permeability; slope of 1 to 5 percent.	Slight	Moderate: moderate shrink-swell potential.	Slight	Moderate: low strength; moderate shrink-swell potential.
Deleon: De	Severe: hazard of flooding; slow permeability.	Severe: hazard of flooding.	Severe: clay; hazard of flooding.	Severe: hazard of flooding; high shrink-swell potential.	Severe: clay; hazard of flooding.	Severe: hazard of flooding; high shrink-swell potential.
Demona: DmC	Severe:	Severe:	Moderate:	Moderate:	Moderate:	Moderate:

interpretations—Continued

Degree and kind of limitation for—		Suitability as a source of—		Soil features affecting—		
Pond reservoir areas	Pond embankments	Road fill	Topsoil	Irrigation	Terraces and	Waterways

TABLE 5.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—					
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill [1]	Local roads and streets
Leeray: LeA, LeB	Severe: very slow permeability.	Slight	Severe: clay	Severe: very high shrink-swell potential.	Severe: clay	Severe: very high shrink-swell potential.
Lindy: LnB	Severe: bedrock at a depth of 20 to 40 inches; slow permeability.	Severe: bedrock at a depth of 20 to 40 inches.	Severe: clay; bedrock at a depth of 20 to 40 inches.	Moderate: moderate shrink-swell potential; bedrock at a depth of 20 to 40 inches.	Severe: clay; bedrock at a depth of 20 to 40 inches.	Severe: low strength.
May: MfA, MfB	Slight	Moderate: moderate permeability.	Slight	Moderate: moderate shrink-swell potential.	Slight	Moderate: moderate shrink-swell potential; low strength.
Menard: MnB, MnC	Moderate:	Moderate:	Slight	Slight	Slight	Moderate: low strength

interpretations—Continued

Degree and kind of limitation for—		Suitability as a source of—		Soil features affecting—		
Pond reservoir areas	Pond embankments	Road fill	Topsoil	Irrigation	Terraces and diversions	Waterways
Slight	Moderate: fair slope stability.	Poor: very high shrink-swell potential; low strength.	Poor: clay	Very slow rate of water intake.	All features favorable.	All features favorable.
Severe: bedrock at a depth of 20 to 40 inches.	Moderate: fair slope stability; high compressibility; thickness of material.	Poor: 20 to 40 inches of material; low strength.	Fair: 5 to 16 inches of loam.	Slow rate of water intake; depth of soil.	All features favorable.	All features favorable.
Moderate: moderate permeability.	Moderate: fair to good resistance to piping and erosion.	Fair: moderate shrink-swell potential; low strength.	Fair: 10 to 18 inches of fine sandy loam.	All features favorable.	All features favorable.	All features favorable.

TABLE 5.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—					
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings without basements	Sanitary landfill [1]	Local roads and streets
Tarrant: TaD	Severe: bedrock at a depth of 6 to 20 inches; 3 to 50 percent stones.	Severe: bedrock at a depth of 6 to 20 inches; 3 to 50 percent stones.	Severe: bedrock at a depth of 6 to 20 inches.	Severe: bedrock at a depth of 6 to 20 inches; high shrink-swell potential; 3 to 50 percent stones.	Severe: bedrock at a depth of 6 to 20 inches; 3 to 50 percent stones.	Severe: bedrock at a depth of 6 to 20 inches; 3 to 50 percent stones.
TNE	Severe: bedrock at a depth of 6 to 20 inches; 5 to 20 percent stones; slope of 10 to 20	Severe: bedrock at a depth of 6 to 20 inches; slope of 10 to 30 percent.	Severe: bedrock at a depth of 6 to 20 inches.	Severe: bedrock at a depth of 6 to 20 inches; slope of 10 to 30 percent; 5 to 20 percent	Severe: bedrock at a depth of 6 to 20 inches; 5 to 20 percent stones.	Severe: bedrock at a depth of 6 to 20 inches; slope of 10 to 30 percent; 5 to 20 percent

interpretations—Continued

Degree and kind of limitation for—		Suitability as a source of—		Soil features affecting—		
Pond reservoir areas	Pond embankments	Road fill	Topsoil	Irrigation	Terraces and diversions	Waterways
Severe: bedrock at a depth of 6 to 20 inches.	Severe: bedrock at a depth of 6 to 20 inches; 3 to 50 percent stones.	Poor: bedrock at a depth of 6 to 20 inches; 3 to 50 percent stones; high shrink-swell potential.	Poor: clay; 3 to 50 percent stones.	Depth to bedrock; slope; stoniness.	Depth to bedrock; slope; stoniness.	Depth to bedrock; slope; stoniness.
Severe: bedrock at a depth of 6 to 20 inches.	Severe: bedrock at a depth of 6 to 20 inches; 5 to 20 percent stones.	Poor: bedrock at a depth of 6 to 20 inches; 5 to 20 percent stones; slope of 10 to 30 percent.	Poor: clay; 5 to 20 percent stones.	Depth to bedrock; slope; stoniness.	Depth to bedrock; slope; stoniness.	Depth to bedrock; slope; stoniness.
Slight	Moderate: fair	Poor: low	Poor: 4 to 10	Very slow rate of	All features	All features

TABLE 6.—*Soil*

Soil name and location	Parent material	Texas report number	Depth from surface	Shrinkage		
				Limit	Linear	Ratio
			Inches	*Pct*	*Pct*	
Cisco loamy fine sand: About 6.6 miles west of Rising Star on Texas Highway 36, 0.3 mile south on a county road, 327 feet west of the road, up a cross fence, in an abandoned field. (Modal)	Calcareous sandy clay loam.	70–72–R	0–10	16	.9	1.80
		70–73–R	10–14	14	11.0	1.92
		70–74–R	50–70	14	5.4	1.94
Deleon clay: About 4.25 miles east of Eastland on Farm Road 570, about 11.75 miles southeast on Farm Road 2214 and 100 feet north of the road, in a pasture. (Modal).	Clayey alluvium	70–443–R	6–30	16	14.4	1.87
Hensley stony loam: About 4.5 miles southeast of Carbon on Texas Highway 6, 2.2 miles south on a county road to an intersection, 0.4 mile on the same county road and 81 feet west of the road, in a pasture. (Modal)	Interbedded clay and limestone.	70–67–R	0–4	14	8.6	1.88
		70–68–R	4–16	13	16.2	1.97
Leeray clay: About 4.8 miles west on Farm Road 2945 from its intersection with U.S. Highway 80 on the western edge of Cisco, 285 feet north of the road, in range. (Modal)	Calcareous massive clay.	70–69–R	6–18	12	19.1	2.00
Lindy loam: About 4 miles south of Carbon on Farm Road 1027, 0.3 mile south on a county road 120 feet west of the road, in a pasture. (Modal)	Interbedded clay and limestone.	70–65–R	0–6	17	7.2	1.84
		70–66–R	14–28	14	13.1	1.91
Nimrod fine sand: About 6 miles south of Eastland on Texas Highway 6, 3 miles east on Farm Road 2563, 1 mile south on a county road, 0.3 mile east on the same county road, 60 feet north of the road, in a wooded area. (Modal)	Trinity sand	70–453–R	6–30	18	0	1.78
		70–454–R	30–40	16	6.6	1.82
Owens clay: About 4.25 miles east of Eastland on Farm Road 570, 5.25 miles southeast on Farm Road 2214, 1.5 miles north on a county road and 99 feet west of the road, in a pasture. (Modal)	Olive shaly clay	70–63–R	5–18	16	15.3	1.88
		70–64–R	18–36	21	14.1	1.77
Pedernales fine sandy loam: About 0.6 mile northeast of the Callahan County line on Texas Highway 206 and 150 feet south of the highway, in a cultivated field. (Modal)	Limy material	70–447–R	0–6	16	2.7	1.87
		70–448–R	6–18	14	12.2	1.92
		70–449–R	40–60	15	9.7	1.91
Thurber clay loam: About 2.6 miles north of Olden on a county road, 400 feet east of the road, in a cultivated field. (Modal)	Calcareous clay and clay loam.	70–444–R	0–5	14	8.8	1.91
		70–445–R	5–22	13	20.9	2.02
		70–446–R	48–70	15	13.7	1.93
Truce fine sandy loam: About 0.9 mile north of the county courthouse in Eastland on Texas Highway 6, 0.5 mile west on a county road and 60 feet north of the road, in a pasture. (Modal)	Shaly clay	70–450–R	0–4	15	3.5	1.87
		70–451–R	5–20	13	13.2	1.96
		70–452–R	46–62	17	10.8	1.88

[1] Mechanical analyses according to the AASHTO Designation T–88 (see footnote 6, p. 43). Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

test data—Continued

Mechanical analyses [1]											Liquid limit	Plasticity index	Classification [2]	
Percentage passing sieve—							Percentage smaller than—							
⅞ inch	⅝ inch	⅜ inch	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO [3]	Unified [4]
------	------	------	--------	100	96	19	13	------	6	3	17	3	A–2–4(0)	SM
------	------	------	--------	100	98	46	42	------	31	29	35	21	A–6(5)	SC
------	------	100	99	97	93	49	42	------	24	15	24	13	A–6(4)	SC
------	------	------	--------	--------	--------	99	97	------	57	43	48	27	A–7–6(16)	CL
------	------	100	99	97	95	73	64	------	25	20	31	16	A–6(10)	CL
------	100	99	99	99	97	83	77	------	56	51	48	26	A–7–6(16)	CL
------	------	------	100	99	98	91	86	------	58	48	56	36	A–7–6(19)	CH
100	99	99	98	98	95	65	58	------	23	15	30	15	A–6(8)	CL
------	------	100	99	99	95	66	61	------	48	45	42	22	A–7–6(11)	CL
------	------	------	100	99	94	8	3	------	2	1	20	2	A–3(0)	SM–SP
------	------	------	100	99	94	30	29	------	23	22	29	16	A–2–6(1)	SC
------	------	100	99	97	93	90	88	------	63	47	51	30	A–7–6(18)	CH
------	100	99	99	99	98	94	92	------	77	55	54	30	A–7–6–(19)	CH
------	------	------	--------	--------	100	48	------	------	------	------	21	7	A–4(3)	SM
------	------	------	--------	100	99	63	------	------	------	------	38	24	A–6(11)	CL
------	------	100	97	93	85	55	------	------	------	------	34	20	A–6(8)	CL
------	------	100	99	98	95	64	------	------	------	------	31	17	A–6(9)	CL
------	------	------	100	99	97	79	------	------	------	------	63	41	A–7–6(20)	CH
------	100	99	96	88	78	50	------	------	------	------	44	30	A–7–6(10)	CL
100	99	99	98	97	95	58	47	------	15	17	21	5	A–4(5)	CL–ML
------	------	------	100	99	97	75	69	------	51	16	40	23	A–6(13)	CL
[5] 96	94	93	89	85	82	75	67	------	37	29	30	20	A–6(12)	CL

[2] Unified and AASHTO classifications made by Soil Conservation Service personnel.
[3] Based on AASHTO Designation M 145–49 (see footnote 6, p. 43).
[4] Based on the Unified soil classification system (see footnote 5, p. 43).
[5] 100 percent passed a 1-inch sieve.

The percentage passing sieve estimates are given for a range in percentage of soil material passing sieves of four sizes. This information is useful in helping to determine suitability of the soil as a material for construction purposes.

Liquid limit and plasticity index indicate the effect of water on the strength and consistency of soil material

susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of *low* means that the probability of soil-induced corrosion damage is low. A rating of *high* means that the probability of damage is high, so that protective measures for steel and a more resistant type of concrete should be used to avoid or minimize damage

content, and slope; if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material, as interpreted from the Unified soil classification, and the amounts of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet, such as excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or big stones, and freedom from flooding or from a high water table.

Dwellings without basements, as rated in table 5, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist

Pond embankments, dikes, and levees require soil material that is resistant to seepage and piping and has favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are unfavorable factors.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of a soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Sand and gravel are used in great quantities in many kinds of construction. A column was not included in the table, however, because the soils of Eastland County are not good sources of sand and gravel.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or the response of plants grown on the soil

vegetation in the waterway is also an important soil feature.

Soil test data

Table 6 contains the results of engineering tests performed by the Texas Highway Department on several

dry state, the material changes from a solid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from solid to plastic. The liquid limit is the moisture content at which the material changes from

TABLE 7.—*Degree of limitation and soil features affecting recreational development*—Continued

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Chaney: ChC, ChC2, CnD3---	Moderate: loamy sand surface layer; slow permeability; moderately well drained.	Moderate: loamy sand surface layer.	Moderate: loamy sand surface layer; slow permeability; slope of 1 to 8 percent.	Moderate: loamy sand surface layer.

TABLE 7.—*Degree of limitation and soil features affecting recreational development*—Continued

Soil series and map symbols	Camp areas	Picnic areas	Playgrounds	Paths and trails
Tarrant: TaD, TNE----	Severe: clay surface layer; 3 to 50 percent stones.	Severe: clay surface layer; 3 to 50 percent stones.	Severe: clay surface layer; less than 20 inches to bedrock; 3 to 50 percent stones.	Severe: clay surface layer; 3 to 50 percent stones.
Thurber: TrA, TrB	Severe: very slow	Moderate: slow	Severe: very slow	Moderate: slow

receive additional water, have less runoff, and are subject to less erosion.

On the steeper slopes geological erosion occurs almost as fast as the soil material is formed. An example is the Tarrant soils. These soils have been forming as long as the less sloping Bolar soils, but they are much shallower in their development.

Time

A long time is required for the formation of distinct horizons. The differences in length of time that parent material has been in place are generally reflected in the degree of development of the soil profile.

The soils in Eastland County range from young to old. The young soils have very little horizon development, and the old soils have well-expressed soil horizons. Bunyan soils are an example of young soils that have little horizon development. Except for a slight accumulation of organic matter and darkening of the surface layer, Bunyan soils retain most of the characteristics of their parent material. Truce soils are an example of older soils that have well-developed soil horizons. They have distinct A and B horizons that bear little resemblance to the original parent material.

Processes of Horizon Differentiation

Three main processes are involved in the formation of horizons in the soils of Eastland County: (1) accumulation of organic matter, (2) leaching of calcium carbonates and bases, and (3) formation and translocation of silicate clay minerals. In most soils more than one of these processes have been active.

Accumulation of organic matter in the upper layer to form an A1 horizon has been important. The soils of Eastland County range from medium to low in organic-matter content.

Some leaching of carbonates and bases has occurred in nearly all of the soils. Leaching of bases in soils usually precedes translocation of silicate clay minerals. Most soils in the county are moderately leached, and this has contributed to the development of horizons. Calcium carbonates have been leached from the upper horizons of most of the soils. The amount of rainfall, however, has not been great enough to leach all the carbonates from the soil. Many of the soils have a layer in which calcium carbonates have accumulated.

In several soils the downward translocation of clay minerals has contributed to horizon development. Bonti, Chaney, Demona, and Truce are examples of soils that have translocated silicate clays accumulated in the Bt horizon. The Bt horizon of these soils contains appreciably more silicate clay than the A horizon. Leaching of bases and translocation of silicate clays are among the more important processes in horizon differentiation in the soils of Eastland County.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas such as countries and continents.

The system of soil classification was adopted by the National Cooperative Soil Survey in 1965. Because this system is under continual study, readers interested in developments of the system should search the latest literature available.[7]

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measureable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 8, the soil series of Eastland County are placed in three categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Ent-i-sol).

The five orders of the soils of Eastland County are Alfisols, Entisols, Inceptisols, Mollisols, and Vertisols.

Alfisols have a light-colored surface layer that is low in organic matter and have a clay-enriched B horizon, an accumulation of aluminum and iron, and a base saturation of more than 35 percent.

Entisols have little or no evidence of development of pedogenic horizons.

Inceptisols have a light-colored surface layer that is low in organic matter, but they lack a clay-enriched B horizon.

Mollisols have a dark-colored surface layer that is high in organic matter, and they have a base saturation of more than 50 percent.

Vertisols are clayey soils that have deep, wide cracks during a part of each year in most years.

SUBORDER: Each order is divided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or the absence of waterlogging or soil differences that result from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order. An example is *Aquent* (*Aqu*, meaning water or wet, and *ent*, from Entisol).

GREAT GROUP: Each suborder is separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to

[7] United States Department of Agriculture. Soil classification, a comprehensive system, 7th Approximation. 265 pp., illus., 1960. [Supplements issued in March 1967 and September 1968]

TABLE 8.—*Classification of soil series*

Series	Family	Subgroup	Order
Bolar	Fine-loamy, carbonatic, thermic	Typic Calciustolls	Mollisols.
Bonti	Fine, mixed, thermic	Ultic Paleustalfs	Alfisols.
Brackett	Loamy, carbonatic, thermic, shallow	Typic Ustochrepts	Inceptisols.
Bunyan	Fine-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Chaney	Fine, mixed, thermic	Aquic Paleustalfs	Alfisols.
Cisco	Fine-loamy, siliceous, thermic	Udic Haplustalfs	Alfisols.
Deleon	Fine, mixed, thermic	Udertic Haplustolls	Mollisols.
Demona	Clayey, mixed, thermic	Aquic Arenic Paleustalfs	Alfisols.
Elandco	Fine-silty, mixed, thermic	Cumulic Haplustolls	Mollisols.
Exray	Clayey, mixed, thermic	Lithic Rhodustalfs	Alfisols.
Hassee	Fine, montmorillonitic, thermic	Mollic Albaqualfs	Alfisols.
Hensley	Clayey, mixed, thermic	Lithic Rhodustalfs	Alfisols.
Lamar [1]	Fine-silty, mixed, thermic	Typic Ustochrepts	Inceptisols.
Leeray	Fine, montmorillonitic, thermic	Typic Chromusterts	Vertisols.
Lindy	Fine, mixed, thermic	Udic Haplustalfs	Alfisols.
May	Fine-loamy, mixed, thermic	Udic Haplustalfs	Alfisols.
Menard	Fine-loamy, mixed, thermic	Typic Haplustalfs	Alfisols.
Nimrod	Loamy, siliceous, thermic	Aquic Arenic Paleustalfs	Alfisols.
Owens	Clayey, mixed, thermic, shallow	Typic Ustochrepts	Inceptisols.
Patilo	Loamy, siliceous, thermic	Grossarenic Paleustalfs	Alfisols.
Pedernales	Fine, mixed, thermic	Udic Paleustalfs	Alfisols.
Tarrant	Clayey-skeletal, montmorillonitic, thermic	Lithic Calciustolls	Mollisols.
Thurber	Fine, montmorillonitic, thermic	Typic Haplustalfs	Alfisols.
Truce	Fine, mixed, thermic	Udic Paleustalfs	Alfisols.

[1] The [illegible] Clay [illegible] named for this series are taxadjuncts to the series because they have a slightly thicker A horizon and

In spring, temperatures are pleasant. March and April are often windy; warm and cool periods follow each other in rapid succession. Thundershowers increase and reach a peak of intensity in May. A few thunderstorms late in spring or early in summer are accompanied by damaging winds or hail.

During summer, daytime temperatures are high. Precipitation decreases during July and August, and the day-to-day weather seldom changes. The relative humidity

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slope or that are parallel to terrace grade.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that

TABLE 9.—*Temperature*

[Data recorded at Flathead [illegible] period of record, 1930-57]

Month	Temperature [1]				Precipitation			
						Probability of receiving—		
	Average daily maximum	Average monthly maximum	Average daily minimum	Average monthly minimum	Average total	0 or trace	0.50 inch or more	1 inch or more
	°F	°F	°F	°F	In	Pct	Pct	Pct
January	56.0	78.2	30.1	12.0	1.62	<1	75	50
February	60.2	81.4	34.6	19.1	1.43	<1	76	55
March	68.2	87.2	41.0	22.5	1.48	<1	80	60
April	77.5	93.0	51.2	33.3	3.04	<1	96	82
May	83.4	96.1	59.4	44.4	4.22	<1	>99	99
June	91.6	99.7	61.4	57.3	3.08	<1	85	73
July	96.3	103.7	70.4	62.8	2.10	4	80	62
August	97.0	105.5	69.5	61.1	2.03	7	69	50
September	89.3	100.9	64.7	47.9	2.45	2	80	70
October	82.3	92.9	52.1	35.2	2.76	3	85	85
November	67.3	84.3	40.0	24.1	1.75	7	73	55
December	59.0	77.8	33.0	17.4	1.39	5	80	60
Year	77.3	91.7	51.1	36.4	27.35			

[1] Length of record, 28 years.
[2] Length of record, 12 years.

are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

dimensions; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimensions.

Munsell notation. A system for designating color by degrees of the

and precipitation

The symbol < means less than, the symbol > means more than]

Precipitation—Continued										
Probability of receiving—Continued					Average number of days with precipitation of—[2]			Snow and sleet		
2 inches or more	3 inches or more	4 inches or more	5 inches or more	6 inches or more	0.10 inch or more	0.50 inch or more	1 inch or more	Average total[1]	Maximum[1]	Greatest depth[2]
Pct	*Pct*	*Pct*	*Pct*	*Pct*				*In*	*In*	*In*
30	15	10	5	1	3	1	(3)	1. 9	12. 0	6
30	15	10	5	2	4	1	1	. 8	5. 0	----------
30	15	8	2	1	3	1	(3)	. 1	1. 0	1
60	40	20	10	5	5	2	1	. 1	2. 0	0
90	70	55	36	20	6	3	2	0	0	0
55	35	25	15	14	4	2	1	0	0	0
39	21	13	9	5	3	2	1	0	0	0
30	16	8	4	3	3	2	1	0	0	0
50	30	21	15	9	5	2	1	0	0	0
51	34	22	15	9	4	2	1	0	0	0
27	14	5	3	1	4	2	1	. 3	7. 1	0
30	15	8	4	1	4	1	(3)	. 4	6. 0	1
----------	----------	----------	----------	----------	48	21	10	3. 6	12. 0	----------

[3] Less than one-half day.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Only the upper part of this, modified by organisms and other soil-building forces, is regarded by soil scientists as soil. Most American engineers speak of the whole regolith, even to great depths, as "soil."

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill normally is a few inches in depth and width and is not large enough to be an obstacle to farm machinery.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. If two sequa are present in a single soil profile, it is said to have a bisequum.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on relatively steep slopes and in swelling clays, where there is marked change in moisture content.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting upon earthy

characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stone line. A concentration of coarse rock fragments in soils that generally represents an old weathering surface. In a cross section, the line may be one stone or more thick. The line generally overlies material that weathered in place, and it is ordinarily overlain by sediment of variable thickness.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable,

series, but a soil of such limited known area that creation of a new series is not believed to be justified.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper,

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil

Map symbol	Mapping unit	Page	Capability unit		Range site	
			Symbol	Page	Name	Page
PeC2	Pedernales fine sandy loam, 1 to 5 percent slopes, eroded	23	IIIe-3	29	Tight Sandy Loam	39
PsD3	Pedernales soils, 2 to 8 percent slopes, severely eroded	23	VIe-1	30	Tight Sandy Loam	39
TaD	Tarrant stony clay, 1 to 8 percent slopes	24	VIIs-1	31	Low Stony Hills	36
TNE	Tarrant stony soils, hilly	24	VIIs-1	31	Low Stony Hills	36
[illegible]	[illegible]	25	IIIs-1	30	Claypan	34

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